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"Beyond the four walls of my building": A case study of #Edchat and the power of connectedness

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To the Graduate Council:

I am submitting herewith a dissertation written by Virginia G. Britt entitled ""Beyond the four walls of my building": A case study of #Edchat and the power of connectedness." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

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A Dissertation Presented for the
Doctor of Philosophy
Degree
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Virginia G. Britt
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Dedication

This dissertation is dedicated to my grandfather, Dr. Charles R. Britt.
Thank you for setting the example of a life-long passion for education and always encouraging me to reach for more.

Acknowledgements

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To the members of the #Edchat community, I thank you for the opportunity to come into your space and view the work you do for the field of education. Your support of the field of education is expanding the opportunities teachers have to engage and grow in community.

Lastly, I want to thank my family for continually supporting me through this process. They never once lost faith in me, even when I would lose faith in myself, and for that I am forever grateful.

Abstract

Professional development is an important aspect of all teachers' careers as a way to continually grow and enrich his/her craft. It is particularly important for K-12 American teachers because of the continual push to increase student achievement. With the introduction of social media networks, teachers are able to connect and learn from others outside their school building to those across the world. While we know Twitter and other social media sites have grown in popularity with educators, we still do not know what is happening within this online space and how it supports teachers. The purpose of this case study of #Edchat, a group of educators who meet weekly on the social media site Twitter, was to investigate informal professional development through the lens of best practices in professional development and communities of practice theory. Data included observations of the weekly chat, interviews with participants and documents from the #Edchat wiki. Findings of best practices and communities of practice included a focus on participants, extended duration, emphasis on content, sustained mutual relationships, rapid flow of information and sharing of resources. The discussion explores ways in which #Edchat stretches beyond communities of practice theory, including modes of connection and conversation, planning and preparation and personal learning networks. The research concludes with implications for re-examining the idea of professional learning in social media spaces.

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Chapter 1

Introduction

Background/Context

Professional development is an important part of most jobs, but it is especially significant in the field of American K-12 education. Those in a leadership role within K-12 education are looking for ways to improve schools and meet the demands of an ever-changing field. Each school year, teachers spend many hours moving back into the role of learner, working to educate themselves on new practices to help them better teach the students in their classrooms. Professional development comes in many different shapes and forms, allowing teachers different ways and opportunities to learn many different topics. Some teachers may spend time learning how to use new technology programs to assist in their teaching, while other teachers spend time within their content area, learning techniques for guiding students to the information they need to succeed. No matter the form, the overall goal of all professional development is to support teachers and continually educate them in ways to better their own practice.

One of the benefits of professional development is that it provides teachers with the time to talk, share, and collaborate with one another (Desimone, 2009). Teaching can be a very solitary profession, as teachers work primarily from their individual classrooms, day after day, working with students. But it is important for teachers to connect with one another, share ideas, and support one another in their own learning. Professional development sessions should, ideally, provide time for teachers to talk with others in their field, giving them the opportunity to share what they are doing in their classrooms, what is working and not working, and to ask for help and advice as they work to make changes.

More and more, teachers are also connecting outside of formal professional development sessions and are sharing information in new ways. From crossing the hall to talking in the parking lot after school, teachers have always found ways to connect and share information and help one another. With the addition of computers, cell phones, and the growth of social media, teachers can connect not just across the hall, but across the world (McMahon, 1997). They are beginning to understand the power of connection and the need for online spaces that will support their development as teachers (Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009). Researchers are noting that teachers can benefit from alternative forms of professional development, the development of community, and access to information to support their work (Dalgarno & Colgan, 2007).

As Twitter has grown in popularity over the years, it has become a place for people to connect and share information as well as to seek knowledge from others (Zhao & Rosson, 2009). Established in the spring of 2006, Twitter was developed as a program that would allow users to send messages, or "tweets," of 140 characters or less out through the Internet (boyd, Golder, & Lotan, 2010). Considered a social networking site, Twitter falls into the same category as sites such as Facebook (http://facebook.com) and Google+ (http://plus.google.com). It is also a "microblogging" site (Java, Song, Finin, & Tseng, 2007; Zhao & Rosson, 2009), which is a subcategory within the world of social networking and is defined as "the act or practice of posting brief entries on a blog or social-networking website" (microblogging, n.d.). This small amount of space to post (140 characters or less), along with the ability to comment in real time and respond to current events (Williams, Terras, & Warwick, 2013) encourages users to share small amounts of information quickly with their followers and expand their range of

communication. Retweeting is the "Twitter –equivalent of email forwarding" (boyd et al., 2010, p. 1) where users create a post using information originally posted by others and can be seen as "the act of copying and rebroadcasting" (p. 1).

The ability to tweet from mobile devices has assisted in the growth of this form of communication (Williams et al., 2013). As of 2014, Twitter has more than 645 million active users and continues to attract over 100,000 new users every day (Statistic Brain, 2014). Approximately 1 billon tweets are sent out every five days, sharing an abundance of information with the masses (Statistic Brain, 2014).

With so many people using Twitter on a regular basis for sharing information, it is no surprise that many teachers are using the site to connect with one another (Visser, Evering, & Barrett, 2014). One example is that of a teacher who posted a tweet in November 2012, stating a desire to include more formative assessments in his/her classes than he/she already did. The teacher finished the tweet with the question, "What are ways you do this??" This message was received, read, and responded to by followers on Twitter. There were nine public responses to this post, in which teachers shared the ways they use formative assessments in their classrooms. In addition, there is the possibility that information was shared with the teacher through private messages.

Through Twitter, this teacher reached out to the education community to informally gather information about how other teachers are using formative assessments in their classrooms. This information is something that could have been gathered in a formal professional development session. But the teacher would have had to (1) research when and where sessions on formative assessments were offered; (2) register (and likely pay); (3) make lesson plans for

substitutes or find a time after school hours; (4) possibly travel to another school site or workshop; and (5) attend the workshop. Instead, the teacher quickly (1) tweeted and (2) read responses with links to further information. This teacher was able to contact other teachers immediately and receive feedback, including ideas and links to more information.

The teacher highlighted in the example above is a member of #Edchat, a group of educators who participate in a weekly Twitter chat on topics related to education. Teachers, principals, counselors, librarians, technology coordinators, those who work in the higher administration of school districts, and many others "gather" each week to engage in conversation with one another on hot topics in education. They use Twitter to connect and talk with one another, sharing their thoughts and links to resources. A topic is chosen (through online voting) and participants post their thoughts, information, and responses on Twitter using the hashtag #Edchat. Conversations often continue past the designated hour. Posts can even be found throughout the week that contain the hashtag #Edchat (as illustrated in Figure 1).

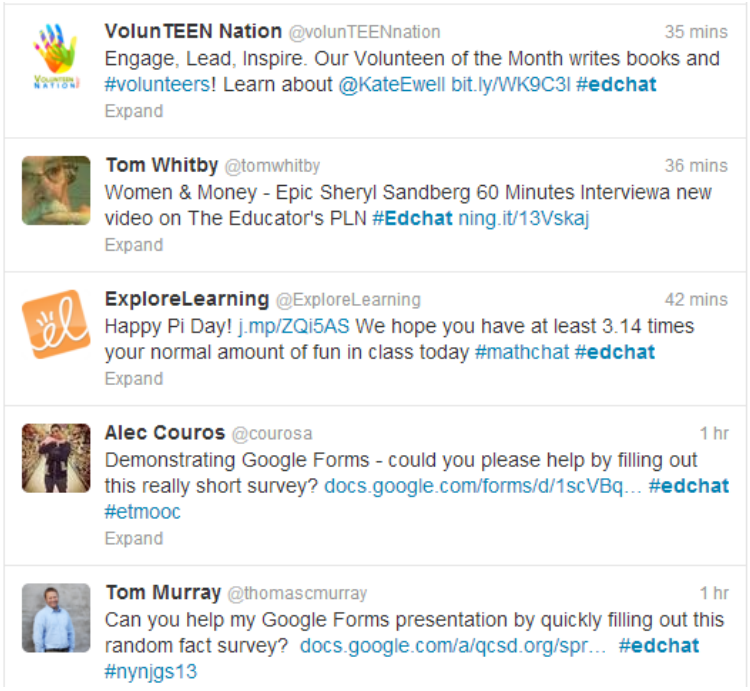


Figure 1. Example of posts using the #Edchat hashtag

#Edchat grew out of an activity known as Teacher Tuesdays, which launched in April 2009. Tuesdays became a popular day for teachers to use Twitter due to the creation of the hashtag #teachertuesday by a Twitter user who goes by the handle @TheEngTeacher. This hashtag was and is currently being used to recommend teachers on Twitter for others to follow, as well as to share links and information on educational topics. A few months later, in September 2009, the #Edchat hashtag began to be used as a way to link together discussions among educators around educational topics. This evolved into a meeting on Tuesday nights at 7:00 p.m. (EST) each week to discuss an agreed upon topic. A number of topics are selected and then voted upon each week. After an influx of participants, especially from Europe, an additional #Edchat was created at noon (EST) to accommodate those in other countries and time zones.

Twitter, however, is just one example of how teachers informally connect with each other. Teachers regularly reach out in an informal way to gather information to help them within their classrooms and to change their teaching practices. Informal conversations have moved online in ways beyond Twitter, with teachers posting similar questions on Facebook or sending an email to a colleague. The overall outcome of all of these connections is that teachers can receive feedback from others within the field of education and begin to make changes to their teaching practices. Public, online conversations through a social networking site or discussion boards have the potential to reach a larger audience than a formal professional development session within a school or school system; thus, understanding what happens in these spaces becomes increasingly important. The goal of this study is to document what is actually happening within one informal, online professional development space—the Twitter #Edchat group.

Statement of the Problem

Under NCLB Legislation, teachers are required to participate in a certain amount of professional development each school year. Schools are continually looking for high-quality professional development opportunities for their teachers (Borko, Jacobs, & Koellner, 2010). Scholars and practitioners have recognized that the more traditional models of professional development, those presented as sessions in face-to-face environments, are ineffective, especially the one-shot, short-term sessions with no follow up (Dana, Dawson, Wolkenhauer, & Krell, 2013). Research has shown that professional development is most effective when teachers have control of what they are learning (Flint, Zisook, & Fisher, 2011). Teachers are searching out places of informal online professional development because they are not able to get what they

need from more traditional professional development. But, we do not yet know how they are participating in such spaces or if the spaces encompass best practices of professional development.

Much of the research in the area of online teacher professional development has been in spaces that were created specifically for professional development to occur (for example, see Koc, Peker, & Osmanoglu, 2009; Schlager & Fusco, 2003; Schlager & Schank, 1997). In contrast, the #Edchat group developed organically as a place where teachers could connect with one another on topics in the field of education. The open social network of Twitter provided the environment for the work, though it was not developed specifically for teacher engagement. Research into this online group could show what aspects of professional development best practices are present and if the group is engaging in community, established through the communities of practice theory, by observing how teachers participate naturally in an informal learning context.

Purpose Statement

The purpose of this case study of #Edchat was to investigate informal professional development through the lens of best practices and communities of practice theory.

Research Questions

1. What best practices of professional development are present on #Edchat?
2. In what ways does the group function as a community of practice?

Significance

Informal professional development is a growing area of research, and the current literature covers a multitude of situations, both face-to-face and online. Elliott, Craft, and Feldon

(2010) presented their research at a meeting of the Society for Information Technology and Teacher Education (SITE), noting that:

> Continued inquiry from the research community into how education professionals use digital learning materials for self-directed, professional and personal growth is necessary to understand the ways in which these media are emerging as personal and professional learning tools and how we can best harness them, or if we should, for improved competence and proficiency in our educational leaders. (p. 448)

Lieberman and Mace (2010) argued that leaders in the world of education should not shy away from these online spaces, but instead encourage teachers to harness the power of these spaces and the time spent there as "opportunities for professional learning and development" (p. 86). Schlager and Fusco (2003) drew upon early research into online communities, especially research on the "virtual environment . . . Tapped In" (p. 203). The goal of the Tapped In project was "to help the education practitioner community understand the affordances of the emerging Internet technologies and rethink their current [teacher professional development] approaches" (Schlager & Shank, 1997, p. 234). From the research on Tapped In, Schlager and Fusco (2003) encouraged future research to focus on how the Internet can support communities of practice, moving away from a focus on the online technology itself.

The findings from this study will contribute to a better understanding of what happens in one online informal teacher professional development site, #Edchat. The findings may help inform the design of future online and even face-to-face informal professional development sessions. Finally, the findings will add to what we know about communities of practice in online educational environments.

Theoretical Framework—Communities of Practice

Communities of practice approaches learning as a part of "our lived experience of participation in the world [and a] . . . highly social phenomenon" (Lave and Wenger, 1998, p. 3). Developed by Jean Lave and Etienne Wenger (1991) in their research on learning in the workplace and later expended by Wenger (1998), they concluded that learning was a social act and not completed in isolation. Within the field of research, it is still under debate as to whether communities of practice is a theory or a framework. Wenger (1998) establishes communities of practice as a theory, a "social theory of learning" (p. 4), and places it in contrast to other theories that take a more psychological approach (see Wenger 1998, p. 280), whereas researchers have also taken up communities of practice as a framework within their research (Buysse, Sparkman, & Wesley, 2003; Hartnell-Young, 2006). Those who use communities of practice as a guide and support within in their research are adding to the ongoing conversation.

For the purpose of this research, communities of practice is viewed as a theory, specifically a part of a social theory of learning to support online teacher interaction. Wenger defined communities of practice as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger, 2006). A community of practice is also defined as a "set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice" (Lave & Wenger, 1991, p. 98). Research on communities of practice has permeated many different environments, including educational settings (Cornelius & MacDonald, 2008; Lewin, Scrimshaw, Somekh, & Haldane, 2009).

Communities of practice "may offer the most promise for altering the linear relationships through which information is handed down from those who discover the professional knowledge" (Buysse et al, 2003, p. 265) to persons who put knowledge into practice. In communities of practice, the emphasis is not on the single professional development activity, but on the development of the community that allows for the establishment of trust and the ability to sustain long-term relationships (Buysse et al., 2003). The need for a strong professional learning community that assists teachers in learning and improving their instruction has emerged from research on effective professional development (Borko, 2004; Ingvarson, Meiers, & Beavis, 2005). The goal of the proposed study was to investigate whether and in what ways the #Edchat group is a community of practice that could assist teachers in improving their instruction.

The three main characteristics of a community of practice are the domain, the community, and the practice (Wenger, 2006). The domain is the shared interest that brings together members of a community. The community is created once people who are working toward the same domain interact with one another, sharing information, participating in activities, and assisting one another as they build relationships. The practice is the creation of a "shared repertoire of . . . experiences, stories, tools, [and] ways of addressing recurring problems" (Wenger, 2006, p. 2) that occurs among members of the community. The practice is not just a shared interest in a topic, but it incorporates the development of "the social and negotiated character of both the explicit and the tacit in our lives" (Wenger, 1998, p. 47). Together, it is these three characteristics that set a community of practice apart from other groups. Each feature is as important as the other and all work in parallel to "cultivate" (p. 2) community.

Communities of practice theory comes with its own set of assumptions about people and the world. The first and central assumption of the theory is that we are social beings. A second assumption is that knowledge is a matter of competencies with respect to valued enterprises. A third assumption is that knowing is participating (active engagement) in the world. A fourth assumption is that meaning is what is produced from the learning and from the community overall. Along with these assumptions, there are also additional beliefs that are a part of the community of practice theory. There is the understanding that learning is ongoing: it is not something we consciously start or stop. We as people are always learning, no matter what the situation, whether it is formal or informal. Through these assumptions and understanding, we know that communities of practice have always existed and can be found everywhere. They form as they are needed and disband when their usefulness has ended and they are no longer needed (Wenger, 1998), continually moving with ebb and flow throughout our lives.

For learning to occur, there are four components that are necessary and mutually exclusive. They are meaning, practice, community, and identity. These components are brought together with the "familiar experience" (Wenger, 1998, p. 6) as the building blocks of the communities of practice theory. Each component is integral to the overall community of practice and each plays into the learning that happens within the community, either as learning as belonging, as becoming, as doing, or as experience.

Meaning is a negotiated process that we are continually working through to find significance within our lives. Community of practice theory begins with the idea of practice as a way to negotiate meaning (Wenger, 1998). Negotiating meaning forms the practice, and then the practice assists in forming the community. Participants must be actively involved in the practice

of the community to begin to create meaning from their experiences. In connecting the separate ideas of community and practice, Wenger (1998) describes three dimensions, including mutual engagement, a joint enterprise, and a shared repertoire.

Mutual engagement is the knowledge of what is going on in the community and how the community works. This "engagement" with one another in the community is negotiated and not defined by geographical parameters or other boundaries, but by the mutual engagement in whatever it is the community is there to do (Wenger, 1998). The second is the presence of a joint enterprise. These are the actions within the group and the negotiated response to the topic of the community. It is, again, decided upon by the participants as they pursue the topic or goal. The third is the development of a shared repertoire. This repertoire is the creation of "resources for negotiating meaning" (Wenger, 1998, p. 82) within the topic or goal of the community.

Examples of the repertoire a community may share might be "routines, words, tools, [and] ways of doing things" (Wenger, 1998, p. 83) that have become a part of the practice and are ways members show their identity to the group. Participation within a community of practice occurs at many different levels (Lave & Wenger, 1991). The term community does not imply a "co-presence, a well-defined identifiable group, or socially visible boundaries" (p. 98) to the community that is formed. The community is formed around the need for shared meaning and how it affects their lives and even their own communities. Because there are no well-defined groups or visible boundaries, this opens up the possibility for communities of practice to be established in online environments.

Wenger (1998) provides a list of indicators of a community of practice.

The following criteria can be used to identify a community of practice, which include the attributes of mutual engagement, negotiated enterprise, and a repertoire of negotiable resources.

1. Sustained mutual relationships—harmonious or conflictual
2. Shared ways of engaging in doing things together
3. The rapid flow of information and propagation of innovation
4. Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process
5. Very quick setup of a problem to be discussed
6. Substantial overlap in participants' descriptions of who belongs
7. Knowing what others know, what they can do, and how they can contribute to an enterprise
8. Mutually defining identities
9. The ability to assess the appropriateness of actions and products
10. Specific tools, representations, and other artifacts
11. Local lore, shared stories, inside jokes, knowing laughter
12. Jargon and shortcuts to communication as well as the ease of producing new ones
13. Certain styles recognized as displaying membership
14. A shared discourse reflecting certain perspectives on the world

(Wenger, 1998, pp. 125-126).

This list, although not mutually exclusive, can be used to assist in identifying whether or not informal professional development groups, such as #Edchat, function as a community of practice.

Educational studies using communities of practice as a theoretical framework began in face-to-face environments. The ability to connect and talk with one another through the Internet has added a new layer to communities of practice theory. Online virtual communities are a growing entity on the Internet and are also a place where teachers can gather to share knowledge and information. Because these online "communities of practice are about content—about learning as a living experience of negotiating meaning—not about form" (Schwen & Hara, 2003, p. 262), the focus is placed on the information being shared. Researchers have developed a shared understanding of communities of practice that allows for communities of practice in online environments to be researched. Therefore, the application of this theory to a space that was not feasible when it was developed is now possible.

In this study, I explored in what ways, if any, the #Edchat group functioned as a community of practice, in particular, how the group met the criteria of mutual engagement, joint enterprises, and shared repertoire. Communities of practice build on the idea of "collective expertise and [are] designed to scrutinize and improve education" (Buysse et al., 2003, p. 265). Teachers, administrators, and researchers can come together to change what they know about effective practices within education through bonds created within the community. By moving away from single instances of professional development to prolonged activities, teachers can grow in their relationship with one another as they implement changes in their teaching. Communities of practice within professional development allow for the possibility that changes to teaching practice will be sustained as teachers feel supported in improving their practices.

Levels of Participation

Identity is an important aspect of any social learning theory, including that of community of practice. This information on identity is not "a change in topic but rather a shift in focus within the same general topic" (Wenger, 1998, p. 145) as the conversation continues around community of practice theory. People consider themselves full participants in many social groups and identify by being a member. In addition, people also identify themselves by their nonparticipation in groups. We come in contact with many people on a day-to-day basis, often learning just enough from others to determine groups we are not a part of and may not ever want to be a part of during our lifetime.

In *Cultivating Communities of Practice: A Guide to Managing Knowledge*, Wenger, McDermott, and Snyder (2002) describe different levels of participation. Those who participate "have different levels of interest in the community" (Ch. 3, para. 13) and the expectation that people will participate at the same level is highly unlikely. Wenger et al. include the role of the coordinator who takes on the role of leader within the group, though there are others who take on leadership roles within the community. There are three levels of participation, including the core group, active group, and peripheral group. The core group makes up 10%-15% of the overall group and is the most engaged group of participants. Next is the active group, consisting of 15%-20% of the total population. The last group is the largest, the peripheral group, who rarely participate and "keep to the sidelines, watching the interaction of the core and active members" (Ch. 3, para. 14). Participants often move between the levels, with the boundaries being labeled as "fluid" (Ch. 3, para. 17), allowing for this movement as the group grows, develops, and even decreases.

Wenger (2011a) expands upon these initial levels of participation through a post on his website where he delves further into the levels of participation, establishing five levels: (1) core group, (2) active participants, (3) occasional participants, (4) peripheral participants, and (5) transactional participants. These levels of participation are illustrated in Figure 2 and show the relationship between the levels. The core group involves the leaders and coordinator. The active group is made up of those who are recognized as a part of the group and help define the community. Occasional participants are just that, those who participate occasionally, and peripheral participants are those who have a connection to the community but do not engage as much. Transactional participants are outsiders who do interact with community members but do not consider themselves members (Wenger, 2011a).

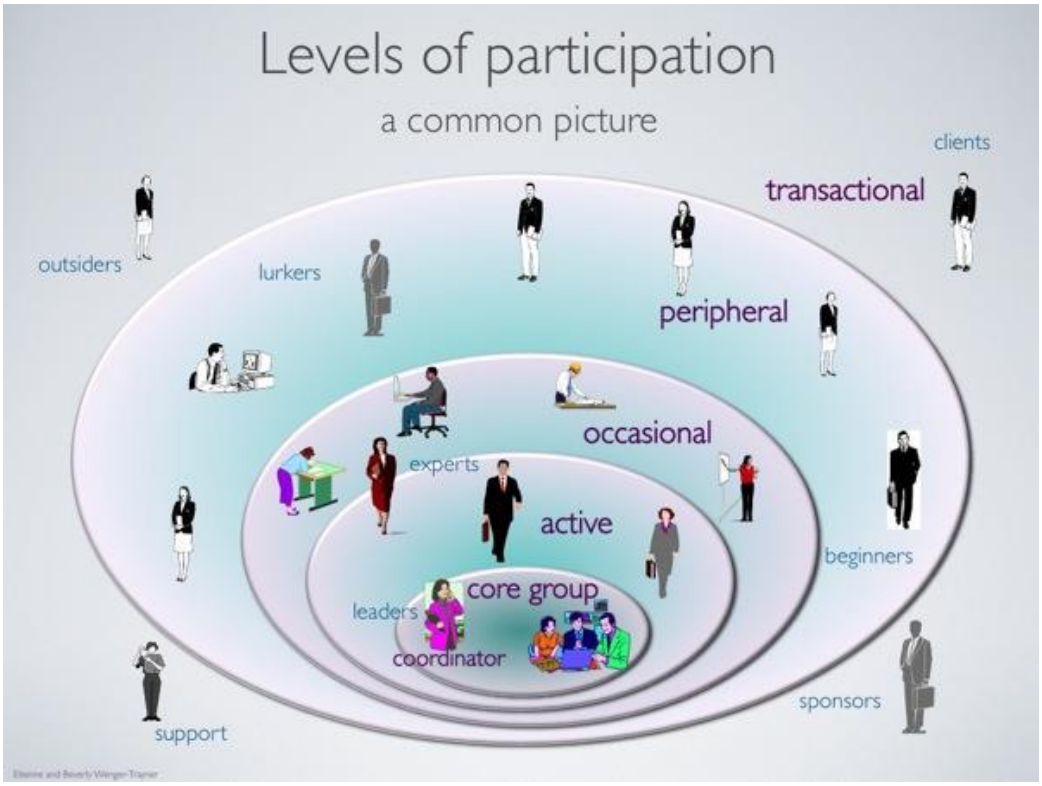


Figure 2. Levels of Participation (Wenger, 2011b)

The largest population of a community falls into the peripheral participants group (Wenger et al., 2002). Reasons for this may include that "they feel that their observations are not apprproate for the whole . . . or [they] do not have time to contribute more actively" (Ch. 3, para. 15). Those who fall into this periphery are still a part of the community as a whole and gain insight from what is observed. Within online groups, the term "lurker" is often used to describe a person on the sideline who does not participate. Little is known about their engement with the group, though researchers have found that those who "lurk" do so to view the conversations, for entertainment, and for access to expertise/experience (Nonnecke & Preece, 2003). Additionally,

Nonnecke and Preece (2003) noted that many participants (approximately half of those they interviewed) use the time they lurk "to evaluate the group for its fit or value to them, and to come up to speed on individuals in the group, dialogue styles, the language of the group, and its rules" (p. 118). Further research is needed on lurkers and research in online groups to continue to view them as an important part of the community. Though they are are not as visible as the core group, they are just as important.

Wenger also states that people move in and out of these different categories throughout the lifespan of a community. Within my research on the #Edchat community, I identified the levels of participation for those interviewed and determined their place within the group. This information assisted in supporting the community and in better understanding the participants.

Wenger (1998) brings into the idea of participation and nonparticipation the concepts of peripherality and marginality. Peripherality is "necessary to enable a kind of participation that is less than full" (p. 165), whereas marginality is a "form of non-participation [that] prevents full participation" (p. 166). The difference between the two depends on trajectory and how newcomers and established members move within the group. Thus emerge four forms of participation: (1) full participation or insider, (2) full nonparticipation or outsider, (3) peripherality as nonparticipation, and (4) marginality as participation by nonparticipation.

Through the research on communities of practice, the idea of the level of participation is important in understanding those who participate in the #Edchat group. These levels of participation assist in locating where a member is within the entirety of the community and possibly his/her trajectory as he/she moves within the group. Also, by identifying the level of

participation in a community, those who exist within the core group can better prepare for the needs of the community.

Legitimate Peripheral Participation. One aspect of the levels of participation is the idea of legitimate peripheral participation. This concept provides a way to discuss the relationship that exists between those who are "old-timers" (Lave & Wenger, 1991, p. 29) and those who are new to the community. This idea of legitimate peripheral participation is encompassed within the levels of participation. The concept of "peripherality provides an approximation of full participation that gives exposure to actual practice" (Wenger, 1998). Legitimate peripheral participation explains how newcomers become a part of the community and is connected to Lave and Wenger's (1991) original research into the investigation of the idea of apprenticeship. Lave and Wenger (1991) proposed that it is by beginning on the edges, or "periphery," that a new member joins the community. Through this experience, in working with an expert in a limited capacity (Lave & Wenger, 1991), new members learn the shared repertoire and ultimately become a member of the community. The premise is that meaning, understanding, and learning all happen together at the same time (p. 15), not separately, as a part of the practice of the community.

Through observation, those on the periphery gain access to the community, but with lessened responsibilities than those who are members (Wenger, 1998). This time of observation is but a "prelude to actual engagement" (p. 100) and opens the three dimensions of the practice, those of mutual engagement, joint enterprise, and a shared repertoire. As newcomers come to the group, they must be provided with "legitimacy" (p. 101) to continue on the path as a prospective member of the community as a whole; otherwise, they may be rejected or excluded.

New members of the #Edchat group are made up of both seasoned teachers and those who are also new to the field of education. No matter what their experience outside #Edchat, new members of the weekly discussions are encouraged to join in and become part of the conversation. Within this study, an understanding of how people join the #Edchat group gives insight into how people participate within the group and possibly provide information on how others can become involved in online professional development groups.

Reflexivity Statement

My knowledge and growth as an educator and researcher has been formed by the people I work with and the experiences I have had throughout my life. I believe that together we construct our meaning of the world, deciding together what the "truth" is about any situation. Because this is the way I see the world, I feel that I most closely associate with the social constructivist paradigm. Constructivists believe that people together co-construct their understandings of the world (Hatch, 2002). Human beings interact with two realities, that of the physical world around us and that of the constructed social reality that produces meaning in our lives. Together in parallel, these two realities interact and influence our daily lives in ways we cannot fully understand (Lincoln, 2005). I have come to this stance, as many constructivists have, by realizing "that it is less the measurable physical . . . reality which determines the shape and contours of social life" (p. 61) but more the meanings behind these realities.

Epistemology is how one sees the relationship between people and knowledge. I see the researcher and those being researched as working together to form the meaning behind that which is being researched. I believe that "meaning is not discovered, but constructed" (Crotty, 1998, p. 9) by all involved. Each person may "construct meaning in different ways" (p. 9) in

regard to the same experience, and each person's interpretation can be seen as the truth for that experience. The constructions that we create from our two realities are then changeable as culture transforms and people change (Guba & Lincoln, 1998). Overall, I believe that we socially construct knowledge and make decisions upon that knowledge that affect our experiences in the world. I believe that teachers communicate with one another in community and construct knowledge together. Teachers then make decisions about their classroom and their teaching practices through their experiences.

Before becoming a researcher, I was a librarian, working in a K-12 setting, and had experiences with traditional professional development that did not always work. Toward the end of my second year of teaching, for example, the school system where I worked purchased and began training teachers on the use of a new online gradebook system. All faculty were told they would need to attend a mandatory professional development session to learn how to use the program. Many of the librarians were not sure whether we should be required to go to this training or not, since the majority of us did not provide students with grades. I proceeded to attend a training session for the new gradebook system, taking time after school to travel across the county to another school where the training was to occur. Once there, I was trained on the program, but at the end of the session when the usernames and passwords were handed out, I was not provided with any log in information. I was told that, as a librarian, I would not have access to the program since I do not input student grades. This baffled me. I was required to attend the professional development session and sit through a training that was paid for by my district. But I would not have access to nor would I be able to use the program.

Though I did attend one or two training sessions that assisted me in my work as a librarian, much of the professional development I attended was more to gather the required hours needed to keep my job than to learn about ways I could improve my work as a librarian. For that type of information, I went online to search out ways to encourage students to use the library, to keep up with current trends in school libraries, and to gather information about new books and materials I would consider purchasing for the library. I also connected with other librarians in my county through email or face-to-face conversations and attended regional and statewide conferences within my discipline. I experienced the power of informal professional development and felt it impacted my work as a teacher and librarian more than the professional development offered to me by my school and school system.

After coming back to school to pursue my doctorate, I was encouraged to start presenting at conferences. One of the first opportunities I had was the Tennessee Educators Technology Conference. My presentation on Web 2.0 tools was essentially a one-shot professional development session that was attended by many practicing teachers. I repeated an expanded session a year later at the same conference and again at a professional development day for a local school system. As I have moved into the role of providing professional development to teachers, I am beginning to wonder how I can best structure my sessions so they will be effective and provide teachers with ways to enhance and grow their teaching practices.

Most recently, I have taken a position as an Instructional Technology Coach within a school system. In this new role, I have the responsibility of overseeing software programs used in the schools as well as responsibilities working with specific teachers at my designated schools. I provide professional development to teachers throughout the school system through individual

programs. Most of the professional development activities are not stand alone sessions that teach teachers about a specific tool. Each session is focused on what the teachers are teaching and uses the technology to support what is already going on in the classroom. This switch in approach shows that schools are taking in the best practices found in good professional development and implementing them in the schools. The school system where I work is also a Twitter community, encouraging teachers to set up a special Twitter account to use with their students.

I came across the #Edchat group after becoming interested in using Twitter in my personal life. Many of my friends were using the social networking site every day, but I was not sure how to incorporate the tool into my daily life. I began by following celebrity Twitter users and friends, but was still not sure of the point of the site. I soon realized that many of the technology blog writers I followed had Twitter accounts attached to their blogs. I began by following a few of them and soon my network grew. Twitter became a way to connect and learn from others in my field, Instructional Technology, and I soon discovered the #Edchat weekly discussion. I then participated one week and added new followers on the site. After discovering the weekly chat, I found out that #Edchat has won an Edublog Award for the Most Influential Tweet Discussion in 2009 and has been featured in *The New York Times, The Washington Post, USA Today, Converge Magazine, EdWeek, T/H/E JOURNAL*, and has been part of the 140 Conferences, conferences dedicated to gathering Twitter users in person (Edchat Tips, n.d.).

My experience with professional development that did not assist me in my practice as an educator, along with my discovery of the #Edchat group, allowed me to begin to look at professional development and community in a new way. Now that I am in a position to both attend and provide professional development to in-service teachers, I am continually growing my

view of professional development. I am personally looking for new ways to engage in professional practice and improve my teaching, as well as ways to provide teachers with meaningful experiences that assist them in their growth as educators. My hope is to discover ways in which I can bring all of these aspects together to better myself as an educator and encourage other teachers to do the same.

I spend time each day within online spaces, such as Twitter and Facebook, connecting with others and sharing information. I have experienced the power of Twitter to help solve teaching problems, engaged in conversations with those in my field, and met people at conferences, moving online connections into offline spaces. My awareness that I have a bias in favor of the use of Twitter for teacher professional development is something I worked hard to remain aware of throughout the research process.

Organization of the Study

The Twitter #Edchat group is a place of informal teacher professional development. Through this study, I explored what is happening within the space, identifying whether best practices were visible and determining in what ways the #Edchat group exhibited characteristics of a community of practice. Chapter 2 provides a thorough review of the literature around professional development, informal professional development, informal learning, communities of practice in educational environments, and research on social networking for professional development. Chapter 3 describes the case study design for studying the #Edchat environment, outlining the process of data collection through interviews, observations, and document analysis, as well as how the data were analyzed. Chapter 4 presents the findings, including how well #Edchat met the best practices for professional development and in what ways it functioned as a

community of practice and where it falls short. Chapter 5 provides a discussion of the findings in light of the literature reviewed in Chapter 2 as well as the theoretical framework, implications of the findings for practice, future directions for research, and concluding thoughts.

Chapter 2

Literature Review

Professional development is required in almost every field. Medical professionals, business people, and sanitation workers all participate in some sort of professional development to increase knowledge or to review protocols used in daily work. Often professional development is used as a way to encourage a change in practice: to move away from the way things have always been done to a new approach. One occupation where professional development is required, typically as a part of the teacher contract, is in American K-12 education.

Research in the field of teacher professional development spans more than a quarter of a century. Reading through the literature on professional development helped me form an understanding of where research in the field began and what research has been conducted over time. Much of the research focuses on traditional professional development activities and programs. Many of these traditional professional development opportunities have been shown to be ineffective. Thus, teachers are increasingly searching out places of informal and/or nontraditional professional development opportunities, at times in online settings, to support their teaching and learning.

I will first share the search methods I used to locate the literature for this review on professional development. I will then briefly discuss research on school reform and the push for professional development within school contexts. Next, I will define professional development and trace how the definition has changed over time. I will also propose a definition that will guide this research study. Then, I will review the literature around “traditional” professional development over the past 20 years including a review of the literature around best practices.

Next, I will review literature focused on online professional development, a form of professional development that takes place over the Internet, including through social networking sites. I will then review literature on informal learning and its place within professional development. Finally, I will critique studies that have used the community of practice theory as a lens within professional development.

Search Methods

Relevant empirical studies, literature reviews, books, and meta-analyses were located by searching Google Scholar, linked to the University of Tennessee database. Additional searches were completed by searching the University of Tennessee library article e-journals database, including Academic Search Premier, EBSCO, and ERIC. This first search phase identified articles and books on the subject of professional development. The search was not limited by year to allow for studies from all decades, including seminal works within the field as well as recent publications. Search terms used included "professional development," "teacher professional development," and "professional development education." Additional terms used were "best practices professional development," "best practices teacher professional development," "characteristics professional development," and "meta-analysis professional development," to assist in gathering research for the different areas of focus within the literature review.

Also in this phase of research, I collected articles and books on the subject of informal professional development published over the past five years (2009-2013). With the field of informal professional development in its infancy, I wanted to review the most recently published work to understand where the field is currently situated. The same strategy was used to identify

literature related to online professional development. The use of computers, cell phones, and the Internet for professional development is a growing area of study; therefore, I felt it was important to explore the most recent articles published in the field.

The second phase of the literature search came from reviewing the reference sections of the articles identified during the first phase. It also helped in identifying seminal articles and articles that have been cited repeatedly. As the articles were gathered around the subject of professional development, areas of focus emerged that were used to guide the structure of the literature review. These themes included school reform, definitions of professional development, and best practices and characteristics of effective professional development. This was followed by definitions of informal learning, online professional development, and features of online social networks as potential spaces for professional development.

The Landscape of School Reform

Discussions of professional development cannot be fully disconnected from the conversation around school reform. Professional development has often been touted as a way to reform schools (Lieberman & Mace, 2010), to influence change in teaching, and to increase student achievement. Over time, internal and external factors create pressure for institutional change (Fullan & Stiegelbauer, 1991). Those within the institution often feel a need for something new, or those outside may no longer feel that the institution is working. It is at that point that the institution must stop, assess where it currently stands, and make decisions about growth and how to best adapt to the new climate of the world in which it exists.

Such is the field of American education. It can seem, at times, that changes are happening on a continuous basis, while at the same time feel as if nothing is changing at all (Fullan, 2007).

Over the past 50 years there has been a call for educational reform, as well as pressure to make changes, especially from external forces such as politicians, parents, and the general public. But reform is a complex process that can take on different forms. Two ways to categorize reform movements throughout the 20th century are as either incremental reform or fundamental reform (Cuban, 1993). Incremental reform works to improve "existing structures of schooling including classroom teaching" (p. 3), and fundamental reform works to permanently transform these same structures. Leaders in the field of education assess the current state to see what kind of reform is needed and decide where to institute change to grow the field to better meet the needs of a changing world. Though many adjustments to teaching, curriculum, and standards have shown to be effective in creating change, one initiative that stands out is the professional development of teachers (Borko, 2004).

Instituting change can be difficult, as people, including teachers, are often resistant to change. There is nothing more frustrating than the promise of professional development that, in the end, proves to have had little to no impact on changing teachers' teaching practices (Fullan & Stiegelbauer, 1991). Because one of the major goals of professional development is to change the way teachers teach, it is important for them to begin to "rethink their own practice . . . and [begin to] teach as they've never taught before" (Darling-Hammond & McLaughlin, 1995). But it is important to understand why they are resistant. People function within different levels of openness, and a person's level of openness to change greatly impacts how he or she will react to the implementation of a new idea (Argyris & Schon, 1974). The majority of teachers teach the way that they were taught and are heavily influenced by the school where they taught during their first couple of years on the job (Fullan & Stiegelbauer, 1991). For teachers to begin to make

changes to their classroom practices, they must first be open to the change and willing to step away from "how things have always been done."

Professional development sessions are often focused on introducing new teaching ideas into the classroom. Training sessions such as these challenge teachers' competence and how they feel about the state of their own teaching (Evans, 1996). The first reaction is often resistance to the change, as sometimes teachers will feel that their current skills are being devalued. In addition, the training they receive often lacks continuity and coherence (Evans, 1996). Sessions jump around to different topics and often do not build off one another, leaving teachers feeling lost and often as if they are on their own to implement change within their classrooms. For training to be effective, it must meet teachers where they are in their own teaching practices and encourage confidence as educators (Evans, 1996). In addition, a school culture that encourages and supports teacher learning is vital to influence change and encourage reform (Jurasaite-Harbison & Rex, 2010). Opportunities for growth and change will become greater when professional development is cohesive, continues over time, meets teachers where they are, does not devalue current classroom practices, and is supported by school culture.

Professional development has continually been included as a part of "broad-based educational reform" (Borko et al., 2010). It has become the way to encourage change in how teachers are teaching and the way to increase student achievement. With the implementation of new legislative matters that influence education and reform of the current system, such as No Child Left Behind (http://www2.ed.gov/nclb/landing.jhtml) and Race to the Top (http://www2.ed.gov/programs/racetothetop/index.html), professional development will continue to be a major topic of discussion. Successful reform movements rest on the teachers (Garet,

Porter, Desimone, Birman, & Yoon, 2001) and on investment in funds and resources to help improve schools.

Legislators and others involved in the field of education are looking for ways to reform schools and make changes in how children are educated. They are looking for means of changing teachers' teaching practices and increasing student achievement and have discovered that professional development is a good place to start. By educating teachers, both on the content they are teaching and on best teaching practices, they can hope to affect what happens inside the classroom.

As leaders look for ways to create experiences that meet teachers where they are, one solution has been the rise of informal online professional development. Ultimately, research on alternative methods, such as online and informal professional development, needs to show how they impact student learning (Dede et al., 2009). First, however, a better understanding of how teachers are participating in informal professional development activities is needed, as this is the focus of this study. By thinking outside the box and exploring new ways of educating teachers, change and reform might occur. With this in mind, we now turn to defining professional development and identifying the characteristics that research suggests, if included, will help in making the experiences effective for teachers.

Professional Development

Defining Professional Development. Professional development for teachers can vary from school to school, encompassing diverse topics and activities. The structure of professional development activities can vary as well, from teachers attending professional conferences away from school to districts sponsoring one-day workshops on site (Flint et al., 2011). Other

structures can include the cascading, or "train the trainer," models of professional development where teachers or instructors are first taught the information and then tasked with returning to their schools or districts to teach the information to their colleagues (Lewin et al., 2009). Professional development can also include afterschool trainings onsite at the schools, with lessons provided by district staff, local school administrators, or even fellow teachers.

Researchers have not yet settled on one definition of professional development, specifically in educational contexts (Evans, 2002). Fullan and Stiegelbauer (1991) defined professional development as the "sum total of formal and informal learning experiences throughout one's career from pre-service teacher education to retirement" (p. 326). This definition is one of the earliest found in the literature and implies that professional development comes from any learning experience a teacher has, whether through formal training in a school setting or through an informal conversation with a fellow teacher. But in their 1992 book, *Teacher Development and Educational Change*, Fullan and Hargreaves stated:

> We will not attempt to define the term teacher development at this stage of the chapter. As will become clear, we use it both to refer to specific developments through in-service or staff development, as well as to more thorough advances in teachers' sense of purpose, instructional skills and ability to work with colleagues. (pp. 8-9)

Thus, they chose not to define the term up front but rather asked their readers to develop an understanding of the term through their discussion of in-service training and staff development. Next, Bredeson (2000), in his study of principals, defined professional development in a way similar to Fullan and Stiegelbauer (1991) in that he did not see professional development as "an event [or] set of activities in schools . . . [but] an integral part of teachers' and principals'

professional work" (p. 399). This definition placed professional development as not just an activity that a teacher may participate in, but as a process that a teacher would engage in throughout his or her time in the profession.

Linda Evans, in her 2002 article, "What is Teacher Development," explored some of the early literature in the realm of teacher development, but also came up short in presenting a complete definition. Evans laid out the need for a definition, stating that by defining the term, a shared understanding could be established. She called for a meaningful conversation on the subject among those involved in the field of professional development and for a consensus to be reached on a definition. Until this happens, though, researchers and practitioners will have to define for themselves the concept of professional development.

This lack of a clear definition allows for the exploration of new ideas surrounding teacher professional development. Researchers have been open about choosing a definition that allows for professional development to change and grow over time. A new understanding of the way the term is defined opens the door to more informal professional development experiences as well as a change in both the form and content of the experiences. By not providing an absolute definition of the term "professional development," structural changes and the ability to "think outside the box" open the door to treat social networking activities as a form of professional development.

I most closely align with the definition posed by Fullan and Stiegelbauer (1991): professional development is the combination of all formal and informal learning that a teacher experiences from their days as a pre-service teacher to retirement. This definition is one of the earliest, but it encompasses all aspects of learning experiences a teacher may encounter throughout his or her development and career. I see professional development as an important

part of any teacher's or educator's professional work that can assist him or her in making changes to the way he or she teaches and enhance the learning within his or her classroom.

Research on professional development for teachers and educators is a well-established field with its roots in the search for ways to assist teachers in their work and boost student achievement. This research has grown through the years and has adjusted to the influence of legislative measures that affect the education of children in K-12 settings. The following is an overview of research in the field and a discussion of where emphasis has been placed in gaining an understanding of how to best prepare and encourage teachers for their work in the classroom.

Previous Studies on Professional Development. In 1989, Carpenter, Fennema, Peterson, Chiang, and Loef unknowingly conducted one of the earliest research studies on professional development that impacted teachers and showed an increase in student learning. Their study investigated the effect of teaching first grade teachers about children's mathematical thinking. They gathered data on how the teachers used this knowledge of children's mathematical thinking in their teaching and what effect this knowledge had on their students' achievement. Carpenter et al. (1989) discovered that by providing teachers with information about students' thinking and approaches to problem solving, "teachers' beliefs about learning and instruction, their classroom practices, their knowledge about their students, and most important, their students' achievement and beliefs" (p. 530) could be affected. This study was one of the first to correlate the idea that if teachers are provided research-based knowledge about their students—in this case their thinking and problem-solving skills—then they will show improvement in their teaching skills and changes in their beliefs about students.

In the years since Carpenter et al. (1989), the extent of research on professional development has grown by leaps and bounds. A number of scholars have published reviews of the literature on teacher professional development (Avalos, 2011; Kennedy, 1998; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). In 1998, Mary Kennedy, a well-regarded leader in the field of knowledge and teaching practice, published her seminal work on the topic of in-service teacher education (what is now referred to as professional development). Her review of the literature focused on published studies that showed evidence of student learning, specifically in the areas of math and science. She discovered that, though most of the studies called for alternative approaches to professional development as a way to improve student learning, the majority of studies focused not on the content of the material covered but on the structure. Knowing that the "one-shot workshop" model was ineffective (Kennedy, 1998), researchers began focusing on finding alternative structures and arrangements of professional development to determine whether they had a better impact on student learning. But these studies were conducted with little regard to the content of those professional development sessions. Kennedy concluded by encouraging researchers to focus more on the content of in-service teacher education, as the content seems to have a bigger impact on student learning. Studies in which content focused on "teachers' knowledge of the subject, on the curriculum, or on how students learn the subject" showed greater influence on student learning than those that focused on other content (Kennedy, 1998, p. 25).

Yoon et al. (2007) reviewed over 1,300 studies identified as potentially addressing the effect of teacher professional development on student achievement. They analyzed only those studies that met the *What Works Clearinghouse* evidence standards, finding only nine. This

finding revealed the lack of research directly examining the link between professional development and student achievement. The results of their review revealed that professional development has a "moderate effect on student achievement" (p. 14), especially in the area of mathematics. They also identified a difference in the amount of professional development teachers received in the studies and the average reported amount of professional development for elementary teachers. Since the majority of articles were thrown out due to the design of their studies, Yoon et al. hope their research has highlighted "methodological pitfalls" (p. 18) that researchers might fall into and want to encourage more research on the effects of professional development. Overall, their research highlights difficulties in designing research studies that link professional development to impact on student learning.

Avalos (2011) conducted a literature review of the professional development studies published over a 10-year period in the journal *Teaching and Teacher Education*. She noted that most professional development has moved away from "one-shot" workshops on a topic or tool. More professional development is being offered that allows teachers more time to learn about a new topic. There are also more partnerships being formed between universities and teachers to assist them in learning new teaching practices. Avalos (2011) also found teacher training to be a very complex process. The culture of a particular school system or community must be taken into account before implementing a professional development program. Many factors play into how teachers learn and what their needs might be in their particular school. A professional development program that was created for one school in North America will not be as effective in a European country or a country in South America, and vice versa (Avalos, 2011).

Though, as Avalos (2011) noted, research is moving in a direction away from the "one-shot" workshops to allowing teachers more time and interaction with the materials they are expected to use, most professional development is still delivered in face-to-face environments. These "professional development [experiences] are aimed towards developing teachers' proficiency . . . to bridge the constantly expanding gap between teachers' previous studies and the developments taking place in the educational realm" (Nir & Bolger, 2008, p. 383). Teachers are still required to take time to attend these sessions in a structured environment as a required part of their job contract. There does seem to be an understanding that changes need to be made to the structure of professional development to allow teachers more time and different ways to engage with the material. Researchers, including O'Sullivan (2002), are beginning to realize that professional development is not a one-size-fits-all project, as cultural contexts must be investigated and considered (as cited in Avalos, 2011).

In summary, Kennedy's (1998) review showed that studies focused on teaching the teachers about how students learn and on the content allowed for more impact than studies that focused purely on making changes to the structure of professional development sessions. Yoon et al. (2007) found only a moderate connection between professional development and effects on student achievement through their review of more than 1,300 research studies, noting limitations in the research methodologies being used. Avalos (2011) concluded that professional development is starting to move away from the traditional one-shot workshops, the structure of the sessions is changing, and professional development is more complex than it may seem.

With the NCLB legislation's emphasis on "effective" professional development, funded research is focusing on finding a correlation between professional development activities and

student achievement. However, first, studies of professional development, such as the Twitter #Edchat group, are needed to provide important background and contextual information on what is happening in these spaces and on how teachers are participating in these groups.

Best Practices of Teacher Professional Development. Traditional professional development is often made up of workshops, courses, or presentations (Cornelius & MacDonald, 2008; Jurasaite-Harbison & Rex, 2010) that are typically provided as school-based learning opportunities (Jurasaite-Harbison & Rex, 2010). Often these sessions consist of short-term one-shot in-service programs (Atay, 2008), but researchers are beginning to see a move away from this shortened structure (Avalos, 2011). Traditional professional development often happens in a structured learning environment (Richter, Kunter, Klusmann, Ludtke, & Baumert, 2011), similar to what the teachers involved would create within their own classrooms for their students. This traditional model of professional development has its place in the educational environment, but it continues to teach teachers as they were taught.

Identifying characteristics or features of a professional development session that make it "effective" in changing teaching practices and affecting student achievement has become a focus of professional development, especially in the past 20 years. This idea of affecting student achievement has become a large push within the field of professional development, mostly because of legislative measures (i.e., NCLB) that impact school performance (Wayne, Yoon, Zhu, Cronen, & Garet, 2008). Funding from organizations such as the National Science Foundation has been allocated to investigate the features of professional development that are effective in "improve[ing] the quality of teaching and boost[ing] student achievement" (Wayne et al., 2008, p. 469). An understanding of best practices that can assist teachers in improving

their quality of teaching is important when investigating modes of professional development such as the #Edchat group.

Scholars have identified characteristics of professional development that they believe have the most impact on teachers' teaching practices (Darling-Hammond & McLaughlin, 1995; Desimone, Porter, Garet, Yoon, & Birman, 2002; Garet et al., 2001; Guskey, 2003a; Guskey, 2003b; Hunzicker, 2011), which include (1) focus on the participants, (2) extended duration, (3) emphasis on content, (4) opportunities for collaboration, and (5) instances of active learning.

Focus on the participants. The first characteristic is the importance of understanding the participants of professional development activities. Darling-Hammond and McLaughlin (1995) identified that effective professional development must be "grounded in inquiry, reflection, and experimentation that are participant-driven" (p. 598), allowing for teachers to have influence over the types of professional development in which they participate. Though this research was conducted prior to the NCLB legislation, their findings are still relevant to the needs of professional development sessions.

Yamagata-Lynch (2003) studied a year-long professional development program on the topic of technology integration and how it fits into the lives of the participating teachers. She noted that teachers have complex work lives and are constantly making decisions and modifying their teaching practices to meet the changing climate of their classrooms. Therefore, they need the "opportunity to assess the relevancy of innovations introduced" (p. 593) through professional development. Implications from this study include the recommendation that those enacting professional development sessions look beyond the focus on teachers' skill needs, but also to the "social, cultural, political and administrative aspects" (p. 605) of schools and school systems. By

understanding the requirements teachers already have and the new activities they are already participating in, new professional development sessions can be designed to fit around existing programs and to focus on topics that teachers see as most beneficial to their teaching practices.

Nir and Bogler (2008) investigated teacher satisfaction of professional development programs. Their study looked at specific types of professional development that they labeled "on-the-job" (p. 377). On-the-job professional development is that which brings together the formal aspect of pre-service programs with the development of teachers once they are in the schools. They concluded that the process of professional development aids teachers in maintaining their professional knowledge and gathering new techniques to use in the classroom. Therefore, the more teachers participate in professional development, the more they will increase their knowledge and skills. The researchers also noted satisfaction with the professional development as an important aspect. Level of satisfaction is described as "a nurturing relationship between the service givers (the instructors in the supervision programs) and the service recipients (the teachers)" (p. 379). It is important, then, for teachers to be satisfied with the professional development sessions they are offered and to be allowed to have influence on the structure and content of such sessions (Nir & Bogler, 2008).

In stepping away from a focus on teachers, Drago-Severson (2007) studied the role principals take in leading teacher professional development. Twenty-five participants, all school leaders, were interviewed, investigating their role in professional development in their schools. The results encouraged the creation of practices "that will help principals and other school leaders to better accommodate the different learning needs [of their] teachers" (p. 114), as well

as practices that encourage the creation of professional development opportunities that excite teachers' thirst for learning.

This first characteristic concentrates on the teachers and principals involved in the professional development sessions, taking into account the human aspect. Each of these studies highlighted findings related to the role of those who participate in professional development. The goal is to not forget the people who are involved as new ideas and activities are planned in hopes of changing teaching practices. Teachers bring to the table different viewpoints and experiences that affect their involvement in the professional development setting.

The overall findings from these illustrative studies showed that teachers need to have influence on their professional development, that teachers need to participate in professional development activities that fit around their current schedules and that can be balanced with programs in which teachers are already participating and that consider teachers' learning needs. All of these aspects are important and could be an impetus for looking further into alternative forms of professional development, such as informal learning opportunities, as a way to meet these needs.

Extended duration. Another characteristic of effective professional development is that programs should be of an appropriate duration. With the realization that one-shot, short-term sessions were not very effective in changing teacher practices (Kennedy, 1998), extending the amount of time teachers have for professional development is considered a best practice. Duration has two aspects: the amount of time a teacher spends within the activity, referred to as contact time, and the "span of time over which the activity takes place" (Garet et al., 2001, p.

920), referred to as span. Though both aspects are measured differently, each has shown to have influence on teachers' classroom practices.

Darling-Hammond and McLoughlin (1995) noted that professional development must be "sustained [and] ongoing" (p. 598). This sentiment was echoed by Hunzicker (2011). Garet et al. (2001) and Desimone et al. (2002) identified adequate duration as a required structural piece, whereas Guskey (2003b) encouraged sufficient time for teachers to engage with the materials for professional development to be effective.

Researchers discovered that extending the duration of professional development allowed teachers time to absorb the information, as well as time to try out the new practices within their classrooms (Garet et al., 2001). However, an increased duration of professional development activities comes at a cost. If outside programs and/or personnel enter a school or school system to provide the professional development, the cost will grow with the extended amount of time (Wayne et al., 2008).

Online professional development, such as through the #Edchat group, may be a way to extend the duration of professional development without incurring the high costs associated with a face-to-face session of the same content. By allowing teachers time to work, typically on their own, through the material in an online environment, the span of the professional development session can be extended as long as needed to grasp the information and try out changes to classroom procedures. Thus, a greater understanding of what happens in a group such as #Edchat is needed.

Emphasis on content. Another best practice within professional development is a focus on content knowledge. Content knowledge refers specifically to the information around a

subject, such as math, science, or language. The actual content of a professional development session can vary, as noted by Garet et al. (2001), who identified four dimensions on which professional development can focus. These dimensions include how much emphasis is placed on the actual subject matter the teachers teach, the particular changes in teaching practice that are encouraged, how much the professional development should affect student learning, and how much importance is given to the ways students learn. The two dimensions that rise to the top and are found in further research are focus on the actual subject matter and knowledge about how students learn (Garet et al., 2001).

Kennedy (1998) found in her review of the literature on professional development that studies focused more on structure and less on the actual information being shared within the sessions. She called for future studies to focus on the content of professional development sessions because she found that teaching practices were influenced more when professional development was focused on knowledge of the subject matter (curriculum) and on how students learn.

More recent studies have attended to both content as well as structure. Basista and Mathews (2002) investigated an integrated professional development program in the area of math and science. Teachers participated in an intense summer institute (through a university) that focused on content knowledge in the areas of math and science and on how to incorporate lessons within both subject areas. They were then followed through the school year as they "modified their teaching practices" (p. 361). The overall goal of the intense professional development was that the researchers saw a need for teachers to employ more "student-centered, inquiry teaching methods" (p. 360) as a way to improve student learning. They felt that by

providing teachers with the opportunity to increase their content knowledge in the areas of science and math, this could be accomplished. The program was successful in increasing teachers' knowledge of math and science, though more importantly it increased teachers' knowledge of how to integrate the two fields.

Through content analysis, Guskey (2003b) located 21 unique characteristics of professional development found within the lists that outlined characteristics of effective professional development published by organizations such as the American Federation of Teachers, Educational Testing Service, the Eisenhower Professional Development program, and the U.S. Department of Education between 1995 and 2001. Though each list stemmed from research that approached professional development in different ways, they all focused on what practices could impact student achievement. The enhancement of teachers' content and pedagogical knowledge was the most cited characteristic, emphasizing that helping teachers to better understand the content that they teach is an important part of any professional development session (Guskey, 2003b).

Another example is a study that investigated professional development for all teachers on how to work with ESL students. He, Prater, and Steed (2011) studied a professional development program that they developed to help teachers in general education classrooms, but with a focus on how to best teach the growing number of English-as-a-second-language (ESL) students within the school system. Their study included 22 teachers—13 general classroom teachers and nine ESL teachers. Each of the professional development sessions they created based its content around best practices for professional development (see Desimone, 2009) and research into teaching ESL students. The results showed that most of the professional development sessions

were considered excellent or good (>90%), and teachers grew in their knowledge of teaching practices, as reported by "pre and post responses to the ESL knowledge inventory" (p. 12). The results also showed an impact on student learning, raising English proficiency test scores of the students who were impacted directly by the teachers who participated in the study.

Findings from these studies show that teachers still need time with the content they teach. Whether they have taught for a short period of time or for many years, returning as students to update the information they teach and learning from the material will only assist them in becoming better teachers. It is also important for teachers to continue to look at their own teaching practices and to be willing to try out new strategies within their classrooms. The #Edchat group may connect teachers with each other so they can share teaching strategies and incorporate new ways of learning into their classrooms. In addition, through their connection to others within their content areas, they can build up their resources and work together to focus on the content they teach every day.

Opportunities for collaboration. The next best practice of professional development is collaboration. Studies have highlighted that it is important for teachers to be encouraged to collaborate as a part of professional development opportunities (Desimone, 2009; Flint et al., 2011; Garet et al., 2001; Meirink, Meijer, & Verloop, 2007). Guskey (2003b), in his review of published lists of effective professional development, noted that collaboration and the promotion of collegiality was prevalent consistently. He shared that "educators at all levels value opportunities to work together, reflect on their practices, exchange ideas and share strategies" (p. 12). But, collaboration does not always promote teacher growth. Collaboration can inhibit

growth if conflict arises. The collaboration itself must be "structured and purposeful" (p. 12) and have clear goals to be successful.

Darling-Hammond and McLaughlin (1995) noted that effective professional development must "be collaborative, involving a sharing of knowledge among educators and a focus on teachers' communities of practice rather than on individual teachers" (p. 598). Laura Desimone, in her 2009 article "Improving Impact Studies of Teacher's Professional Development: Toward better Conceptualization and Measures,*"* proposed a model to which all empirical studies of professional development would be compared to build a consistent knowledge base. Desimone (2009) considers collaboration, labeled as collective participation, to be one of the most crucial elements, especially when the teachers come from the same school or school district, as it allows the opportunity for interaction and for teachers to engage in conversation.

The use of collaboration helps professional development to be "meaningful to teachers" (Flint et al., 2011, p. 1164). Riel and Becker (2000) found that teachers who were encouraged to collaborate were more likely to use constructivist and collaborative instructional strategies in their classrooms as compared to those who did not participate in collaborative activities. Those who stayed isolated in their classrooms were more likely to use direct instruction with their students.

Avalos (2011), in examining 10 years of research published in the journal *Teaching and Teacher Education* that focused on professional development, found the idea of co-learning as a strong, underlying concept within the studies. The "formalized experiences such as courses and workshops that introduce peer coaching or support collaboration" (p. 18) often grew out of more informal experiences that teachers experienced in their schools. Overall, teachers indeed talk

with one another and that talk can be guided into a more educational experience that supports the solitary activity of teaching.

Collaboration allows for teachers to interact with one another around a common activity or topic. Through their relationships with one another, they are able to work together toward a common goal and to support one another along the way. Professional learning communities are a way to pull together the knowledge educators have and support professional development. In my investigation of the #Edchat group, I looked for instances and methods of collaboration among teachers and how they use the space to share and exchange information, to connect with one another, and to develop community (Elliott et al., 2010). I also explored whether the collaboration moves the participants forward or if the conversation perpetuates conflict and lack of growth.

Active learning. Active learning has been identified as a key component of professional development activities. A push is being made to engage teachers in more active learning experiences (Borko et al., 2010). Garet et al. (2001) and Desimone et al. (2002) both noted teachers' active involvement in the learning process as one of the three core features needed for successful professional development activities. They used this term to refer to activities where teachers were able to participate in discussion and engage in the practices highlighted during the professional development. Garet et al. (2001) divided active learning into four dimensions: observing and being observed teaching, planning for classroom implementation, reviewing student work, and presenting reading and writing.

Webster-Wright (2009), in her article on professional development across professions, highlights the idea that moving from passive to more active forms of learning requires a new way

of thinking about learning. Learning can no longer be thought of as taking in knowledge in order to fill a "container" (p. 713) but rather as through experiences, learners are able to be actively involved in the process. Professional development allows for different aspects of active learning. In my findings I report on ways in which participants of the #Edchat group became involved with the information and took on active learning within the weekly discussion.

***Summary*.** Studies published within the field of professional development have noted a shift away from the traditional, one-shot model. Teachers have a stronger voice in what types of professional development they participate in and when they are offered. The amount of time provided during the professional development sessions and the opportunity to increase the span of time that a topic is covered allow for a deeper engagement with the material and support in making changes to classroom practices. These changes to the structure of the professional development seem to open up more opportunities for learning and changes to teaching practices.

The content shared within professional development sessions has shifted as well, with a return to content knowledge focused on subject matter. In addition, allowing teachers to spend time thinking about the ways in which their students learn has shown to have an impact on teaching practices. The amount of professional development teachers are required to participate in each year varies from school system to school system. With such a limited amount of time to work with teachers, it is important to focus the content that will be covered within the sessions.

Professional development is also moving away from continuing to instruct teachers as they were taught in school and into guiding teachers to the way they should teach. As more collaborative work with students in the classroom is being encouraged, it makes sense to encourage teachers to participate in more collaborative professional development. Teachers are

encouraged to work together and to exchange concepts and ideas. The overall change in format is moving toward more active learning opportunities.

These best practices—(1) focus on the participants, (2) extended duration, (3) emphasis on content, (4) opportunities for collaboration, and (5) instances of active learning—are emerging from the literature on professional development as ways to make learning more effective for teachers. These characteristics, if present, can allow teachers to make changes to their teaching practices and better their classroom environments. With this knowledge, future research on professional development should take into consideration aspects of these best practices.

In recent years, alternate forms of professional development have emerged, some of which have moved into online spaces, and have encouraged more informal learning opportunities. With the proliferation of technology use in both the personal lives of teachers and within the classroom, online professional development is a natural shift in both resources and structures for professional development. Informal learning shifts away from the more traditional, formal learning opportunities teachers have been presented with in the past. I next review literature around these two emerging alternatives to the traditional professional development model.

Online professional development. With the proliferation of the Internet and the availability of computers and mobile devices, many of our daily activities have moved into online spaces. Professional development is no exception. Research into online teacher professional development (oTPD) began in the late 1990s with researchers from Harvard University and exploration of programs such as the online community TappedIn.org (Lieberman

& Mace, 2010). Dede et al. (2009) proposed a research agenda for the field of oTPD, suggesting that it be seen as a way to create professional development opportunities that fit better into teachers' busy schedules and draw upon resources from outside the local school. Throughout their research into oTPD, Dede et al. (2009) identified similarities and differences between face-to-face professional development and oTPD. Both need a good design, a way of evaluating effectiveness and impact, appropriate tool use, and effective learner interactions (Dede et al., 2009). Some aspects are specific to online environments. A lecture model might not work as well online as it would in a face-to-face situation, but an online environment would allow for longer discussions and participation from those who may not speak up in a face-to-face environment (Dede et al., 2009).

Dede et al. (2009) concluded that there continues to be a need for "evaluation-based marketing in academia" (p. 13), but it needs to be coupled with research that explains why an intervention or technique works and to what extent. By combining these two aspects, a fuller explanation and understanding of the online professional development session can be discovered. They encouraged establishing clear research questions and defining terminology within each online activity. In addition, they urged educators to use new outcome measures because they provide "usable knowledge" (Dede et al., 2009, p. 15) that can assist in informing practice and assist in the field of online professional development. They recommended that future research look at existing models of professional development and not create their own, and that future studies take advantage of the "unique data collection possible in online programs" (p. 16).

Keown (2009) studied virtual online communities of practice as a form of professional development for teachers. His research concluded that in the creation of an online community,

they should be of a reasonable size (10-20 participants) with a diverse population. He also discovered that the participants must be given adequate time to participate within the virtual space to allow for rich discussions.

Lieberman and Mace (2010) noted that teachers are blogging, sharing information online, connecting with students and other teachers through email, and integrating technology into their classrooms. They argued that it would be a logical extension for teachers to begin to use these online spaces in ways to assist them in their own professional learning. They encouraged the idea that teachers should move what they are already doing into public space, where they share their processes and their practice, as well as reflections, to an educational audience (p. 78). The ability is there for teachers to share what is going on in the classroom with the world through the Internet and gather feedback. Teachers no longer have to work (or suffer) in silence but can reach out to find ways to change their practices.

Lieberman and Mace (2010), in addition, studied other countries that are creating more collaborative professional development opportunities, as well as focusing on increased teacher learning. Overall, they encourage the idea of "'grow your own' professional development [to grant] value to the everyday decisions that shape teaching and learning in classrooms" (p. 86). Through their research they have found that teachers are beginning to share more in online spaces and are allowing these experiences to transform the work of teaching and learning.

Fishman et al. (2013) continued the conversation around online versus face-to-face professional development. Their focus was on comparing modality of services and "whether there are differences in teacher knowledge and beliefs, classroom practice, and student learning outcomes related to PD" (p. 426). The outcome of their study indicated no significant changes

between conditions. Though this discovery was not revolutionary, they focused more on the affordances offered through online professional development, such as proximity to practice, as it was available during the school year, and the ability to work at a pace set by the teacher. Also, the online professional development allowed teachers to gather in an online space, "making [PD] available to geographically isolated teachers" (p. 428). These affordances "may balance out the affordance of the face-to-face PD, which included greater collegiality, sharing of information among teachers and emergent discussions among participants" (p. 435).

Moving in a new direction is the work of Reeves and Pedulla (2013). Their research began with the assumption and understanding that online professional development for teachers can be an effective form of professional development. Their focus shifts the specific features of online professional development that impacts outcomes, specifically in the area of teacher knowledge, classroom practice, and student achievement. "Teacher knowledge predicts improvements in classroom practice with a trickledown effect to student achievement" (p. 62), and in the area of classroom practice, statistical gains occurred when schools supported incorporating what teachers learned through online professional development into their classroom instruction. Last, "the availability of technical support" (p. 63) was the only finding that supported student achievement. The researchers found that having technical support available was predictive of "PD content implementation" (p. 63), thus leading to greater application and effect on student achievement. Their study is in response to a call for more research into the effectiveness of online professional development, as well as replicating their findings in multiple contexts, and they encourage further research to better evaluate the effectiveness of online professional development.

In summary, Dede et al. (2009), Keown (2009), Lieberman and Mace (2010), Fishman et al. (2013), and Reeves and Pedulla (2013) have made initial contributions to what we know about online professional development, and their studies represent the field of research in this area. My study of the #Edchat group views an existing online group within a unique space (Twitter) and incorporates analysis of the group's communication transcripts (tweets). This study of the #Edchat group stands in contrast to studies of groups that were designed for teachers in online spaces (for example, see Barab, MaKinster, Moore, & Cunningham, 2001; Schlager & Shank, 1997), as this group was a grassroots effort created by teachers themselves. In addition, my research on an online space that assists teachers in their professional development supports the researchers and practitioners alike who are expanding the availability of online professional development as a way to change and enhance the work of teachers. The population of the #Edchat group is very diverse, because the online environment allows for participation from people across the globe. This study explored an online professional development experience that has not yet been studied.

Informal Learning

#Edchat and its place within the social networking site Twitter is an instance of informal learning and online professional development. Up to this point, the review of the literature has focused on the idea of formal, traditional professional development and online professional development. Informal learning can be defined as learning opportunities that do not follow any specific curriculum and are not constrained to a certain environment (Desimone, 2009; Richter et al., 2011). Informal learning is receiving increased research attention, especially in the field of adult education. This definition allows for a "much wider variety of settings than formal

education or training" (Eraut, 2004, p. 247) and can be considered a "complimentary partner to learning from experience" (p. 247).

Informal learning is an appropriate theory to use in understanding what is happening within a social media context. Research into informal learning is a broad and growing field. In recent years, a focus on the affordances of technology for informal learning has been on the rise. Clough, Jones, McAndrew, and Scanlon (2008) focused on how technology, specifically PDAs and smartphones, can support informal learning. They found that for "mobile device enthusiasts" (p. 368), mobile devices can be used to support intentional informal learning and will adapt their use to support their learning needs. Jones, Scanlon, and Clough (2013) focused on the use of mobile learning using a variety of devices. Their findings showed that technology was able to support situations where learners worked in an informal context without support and where they had free choice regarding their area of inquiry.

Research into students' informal learning within K-12 education is also growing, especially with regard to students. An understanding of how students engage in informal learning supports research in the field of education, which supports the work of teachers. Cox (2013) focused on the area of e-learning and its development, noting that as the field of information technology (IT) has grown, teachers can no longer "control the range and extent of e-learning use of individual learners because of their increasing access to IT beyond the classroom" (p. 16). With a lack of knowledge about how students engage in e-learning outside formal learning environments, there is a growing need to better understand how students "perceive, understand, and interpret knowledge" (p. 16), which will then support teachers' work. Marty et al. (2013) conducted research on elementary students in the field of scientific inquiry, using both online

and mobile computing in formal and informal learning settings. They incorporated The Habit Tracker project to aid students as they learned and explored before and during a trip to a wildlife center. Students' digital literacy skills increased while they explored "the nature of science and scientific inquiry" (p. 418) within an informal learning environment.

Informal learning research has also been conducted on high school students. Greenhow and Robelia (2009) focused on students' need for "technological fluency, digital citizenship and other twenty-first century competencies" (p. 135). Their research on students' use of *MySpace* explored the social network as a place for informal learning and shared how the Internet may be a good space to supplement students' in-school learning. The research on students' engagement with informal learning supports the research on teachers' informal learning and provides additional support for its inclusion both in and out of the classroom.

Within teacher education, informal learning can be defined as interactions between teachers where there is reflection on practice in both planned and chance environments (Jurasaite-Harbison & Rex, 2010). Data collected in the 1999-2000 Schools and Staffing Survey (SASS) shared how teachers participated in both formal and informal learning (Choy, Chen, & Bugarin, 2006; Richter et al., 2011). Nearly all of the teachers (98.3%) participated in some sort of professional development activities. A large number of those who responded to the survey (93.8%) participated in formal activities, such as workshops, conferences, or trainings. Fewer participated in what would be considered more informal professional development, including scheduled collaboration (72.6%), mentoring (41.9%), and observations (34.4) (Choy et al., 2006).

Sharples, in a 2000 publication, predicted that technological advances would likely influence how teachers connect with one another. He stated that "just in time learning," learning that is provided just as teachers need it, would advance as teachers had the ability to talk to and interact with one another and to gather information. Until recently, little research had been conducted on alternative forms of professional development (Garet et al., 2001), including instances of informal learning. Garet et al. (2001) stated that investigating these alternative forms of professional development could help to inform the characteristic of "high-quality professional development" (Garet et al., 2001, p. 236). As of 2009, some studies have focused on informal learning opportunities for professional development (i.e., Hoekstra, Brekelmans, Beijaard, & Korthagen, 2009; Jurasaite-Harbison & Rex, 2010) as well as how teachers are taking advantage of both formal and informal learning opportunities (Richter et al., 2011).

Hoekstra et al. (2009) studied 32 teachers in the Netherlands, where educators are often left on their own to implement required parts of reform movements that are placed upon them. The most important finding was that teachers differ in the way that they learn informally, and the support for this learning must be differentiated. Jurasite-Harbison and Rex (2010) studied informal learning with teachers in the United States, Lithuania, and Russia. Case study methodology was used to gain a sense of what was happening within each of the schools in regard to professional development and teacher learning. Their findings showed that school traditions were important in the creation of informal learning environments and concluded that informal learning happens in schools when a number of factors are present, specifically when a school's "environment promotes professional interactions . . . [and] teachers regard informal learning as an important part of their professional missing word" (p. 276).

Richter et al. (2011) collected data from nearly 2,000 teachers in Germany, looking at their use of professional development across the span of their careers. They defined informal learning as collaboration among teachers and use of professional literature. They found that older teachers used professional literature more than younger teachers. They also discovered that those teachers who had high work engagement undertook more informal learning.

Overall, these articles highlight aspects of informal learning within teacher professional development, supported by findings from research on students. Findings suggest that teachers must still be supported during informal learning, that school culture and traditions play into whether or not teachers participate in informal learning, and that teachers engaged in their work are more likely to seek out instances of informal learning. This insight can assist researchers as they investigate instances of informal learning to better understand the teachers who seek out instances of informal learning.

Informal learning has not received as much research attention in the professional development field and, yet, instances of informal learning with teachers are becoming more prevalent within schools. When these activities are paired with formal professional development, both inside and outside the school building, teachers are provided with a balanced learning program (Schlager & Fusco, 2003). Together, these different types of professional development allow for teachers to improve their teaching practices within the classroom. Understanding how participants engage in the #Edchat group will contribute to what we know about informal online professional development opportunities.

Communities of Practice and Professional Development

Some of the literature on informal learning and professional development has been grounded in communities of practice theory (Hartnell-Young, 2006; Warren & Little, 2002), which was introduced in Chapter One. Researchers continue to investigate how communities grow and advance and what assistance community provides in the level of growth and development of the participants. Studies that have brought together communities of practice and professional development have been situated in both face-to-face and online environments. Within online environments, the studies investigated communities that were designed to support teachers, those created to build community, and those created to support informal learning.

Two examples of face-to-face professional development are in the field of physical education (MacPhail, Patton, Parker, & Tannehill, 2014) and in math education (Brodie, 2004). MacPhail et al. (2014) compared four case studies focused on teachers and pre-service teachers participating in a physical education teacher education (PETE) program. The results of the study established evidence of a community of practice existing at varying degrees and information to support communities of practice surviving at varying levels within various groups. The teachers experienced knowledge construction over time "resulting in frequent discourse and active and social engagement that varied in degree depending on the stage of CoP [communities of practice] development" (p. 51). Brodie (2014) focused on math teachers, investigating learner errors and how to approach errors with students when working math problems. Within this context, community "can be a mechanism for supporting teachers to challenge fundamental assumptions" (p. 236) and be an impetus for change.

Within online environments, many of these communities have been designed specifically to support teachers' conversations and interactions (Koc et al., 2009). One example is the TAPPED IN environment (Borko et al., 2010), which included both synchronous and asynchronous tools to allow teachers to communicate and share information. Some have questioned whether or not TAPPED IN constitutes a community of practice (Schlager & Fusco, 2003), as the developers themselves have struggled to define the "practice" of the community. Another example would be the Inquiry Learning Forum (E-ILF), a virtual community that supported both preservice and inservice teachers (Barab et al., 2001). Researchers are continuing to wrestle with using communities of practice theory as a lens for understanding professional development and online environments.

Some studies have focused on building community in online environments (Borko et al., 2010). Johnson (2001) makes a distinction between communities of practice and virtual communities. Virtual communities, according to Johnson (2001), are those that are designed specifically for their participants using the technology at hand, whereas communities of practice develop naturally out of the virtual communities and cannot be planned. Overall, both types of communities have a life cycle (Johnson, 2001). They begin small, grow, and at some point will dwindle after fulfilling a need for teacher learning. Though the research by Johnson (2001) conducted on online communities of practice came before the creation of the social media site Twitter, his focus on spaces of online learning is relevant to future communities in spaces not yet developed. Goodyear, Casey, and Kirk (2014) took up the idea of social media and investigated its role outside a community of practice (CoP). Goodyear et al. (2014) found social media functioning as an outside location, "external to the physical site of a CoP" (p. 7), for the teachers

in the UK whom they studied. They discovered that the teachers' experiences on social media sites supported their development as teachers, enhanced their learning, and allowed them to move toward pedagogical change.

Cornelius and MacDonald (2008) investigated a community of practice within a virtual environment. Teachers and instructors with the Open University in Scotland did not have the opportunity to meet in face-to-face environments because of the make-up of the school. Online forums were created as a way to engage instructors and allow them to talk together about their teaching experiences. This virtual space was created as a place for instructors to communicate with one another, but an unexpected community of practice emerged. Participants developed a shared repertoire, worked to share experiences, and engaged in joint activities. Cornelius and MacDonald demonstrated the potential for online networks to support the professional development of tutors and for online networks to allow for informal networking to occur.

Gray (2004) took the research on online communities of practice and focused specifically on the informal learning that took place. The participants in this community of practice were coordinators with the Alberta Community Adult Learning Council, and the researcher served as both researcher and moderator for the first year of the pilot program. This virtual community was created expressly for the purpose of gathering the coordinators into an online space where they could communicate in both private and public spaces. The focus of the research was on "increase[ing] . . . understanding of the functions online communities can serve in an organization and what factors influence learning and participation in these voluntary contexts" (p. 21). There was also interest in the role of informal learning, the motivation for participation, and what role the moderator played within the community. The study established that this online

group functioned as a community of practice and was able to operate as a tool for informal learning within the day-to-day work experience. Motivation for participation expressed through why participants kept coming back included the ability to interact with others who could assist in their work and feeling connected to others. Participants also felt the moderator held an important role within the community and was an integral part of its success.

Online, virtual environments have been found to support teacher learning, but even when designed with community-building in mind, what develops may not fit the communities of practice criteria. In contrast, there are times when virtual communities grow into communities of practice. In addition, there are times when communities of practice emerge from places where you would not expect to find them. This investigation into the #Edchat group explores each of these aspects, looking for instances of a community of practice found in an unplanned virtual community within an online social environment. Bringing together informal learning and professional development within the communities of practice theory provided a useful lens to study the #Edchat group and understand how it functions within these constraints.

Conclusion

Professional development is the collective learning, both informal and formal, that a teacher experiences throughout his or her career (Fullan & Steigelbauer, 1991). While previous research has focused on many different aspects of teacher professional development, few studies have focused on alternative methods of professional development, such as informal learning through social networking.

Many studies on professional development have investigated best practices that should be present to institute effective changes to the teaching practices of the teachers involved. These

characteristics include focusing on the participants, extending the duration, placing an emphasis on content, allowing for collaboration, and incorporating active learning. As professional development moves into online spaces, it is important to discover whether these aspects are a visible part of the learning amongst teachers. Such a research focus can help identify virtual communities that function as a form of professional development and help teachers change the way they approach their own teaching. Communities of practice provide a space for professional development to move away from the purely linear diffusion of information. This study of the #Edchat group explored one example of informal professional development, how it reflected best practices, and the ways in which it constituted a community of practice.

Chapter 3

Methods and Procedures

The purpose of this case study of #Edchat was to investigate informal professional development through the lens of best practices and communities of practice theory. This study considered #Edchat as a case of informal professional development within the context of Twitter, identified instances of best practices, and ascertained whether and in what ways it constitutes a community of practice.

Through the research, I explored the following questions:

1. What best practices of professional development are present on #Edchat?
2. In what ways does the group function as a community of practice?

Below, I outline the design of the study and sources of data. I follow this with a detailed list of procedures, including how data were collected and analyzed. I end the chapter with information on how I established trustworthiness and dependability within this study.

Research Design

My approach to the research is an instrumental case study. Case study research can be defined as an "in-depth description and analysis of a bounded system" (Merriam, 2009, p. 40). Instrumental case studies focus on the need for general understanding around a subject or topic (Stake, 2005) and are a good way to initially investigate a phenomenon. Stake states "knowledge is socially constructed . . . and thus case study researchers assist readers in the construction of knowledge" (p. 454) by sharing both the experiences of those they study and their own experiences with the research.

Through this study I investigated the #Edchat group to see if best practices were present and what aspects, if any, of a community of practice were present. Observations of the weekly chat and interviews with participants provided the data to determine if the #Edchat group functioned as a community of practice or just another online discussion group. Through the research process I explored the participants' experiences within the #Edchat group and the roles they play in the weekly chat.

The case is defined as the #Edchat group that gathers weekly on the social networking site Twitter to converse on a topic in the field of education. The membership of this group changes each week due to its online nature within an open social network. Due to this unique group makeup, I establish the bounded system as the people participating in the #Edchat discussions during the five sessions I observed.

Context and participants

The #Edchat group meets weekly at 7:00 p.m. (EST) on Tuesday nights to discuss emerging trends and topics in the field of education. The hashtag #Edchat is used as a way to connect these related posts. Anyone can join in and participate in the weekly discussion, as long as they have a Twitter account and add the hashtag #Edchat to each post. When joining the group, members are encouraged to introduce themselves on the #Edchat wiki introductions page. The #Edchat Wiki (http://edchat.pbworks.com) is a dedicated online space used by those associated with the group to post information, introduce themselves, and hold the weekly chat transcripts. Participants share on the introduction page their Twitter name, real name, job title, and blog address.

The #Edchat group is made up of teachers from every grade level and subject area, principals, parents, administrators, technology coordinators, and even politicians. Prior to the start of this study I had observed the weekly discussion many times since 2010 and even participated a few times. I follow and am followed on Twitter by some of the #Edchat group members, but before this study I had not met any of them in person or outside the group. Since the start of the study, I have met three members at conferences.

Participant recruitment. I contacted the administrators of the #Edchat group by email to ask permission to conduct research on the weekly chats for my dissertation and also asked for permission to contact members of the group for interviews. In this way, informed consent was gathered in writing from a minimum of one person identified as an administrator of the #Edchat group.

Data Collection Procedures

My sources of data included observations, interviews, and document analysis. Each data source was connected to my research questions. This ensured that all data collected assisted in answering the research questions set forth in the study (see Appendix C).

A flow chart of the research design, outlining the relationship of purpose, theoretical framework, research questions, data collection, and trustworthiness, is shown in Figure 3. Data collection occurred during the months of October and November 2013. After two observations, I began the process of contacting members of the #Edchat group to participate in interviews. Interview data (8) were collected from late October through November. Documents from the #Edchat Wiki, including the homepage and chat tips, were also gathered during that time.

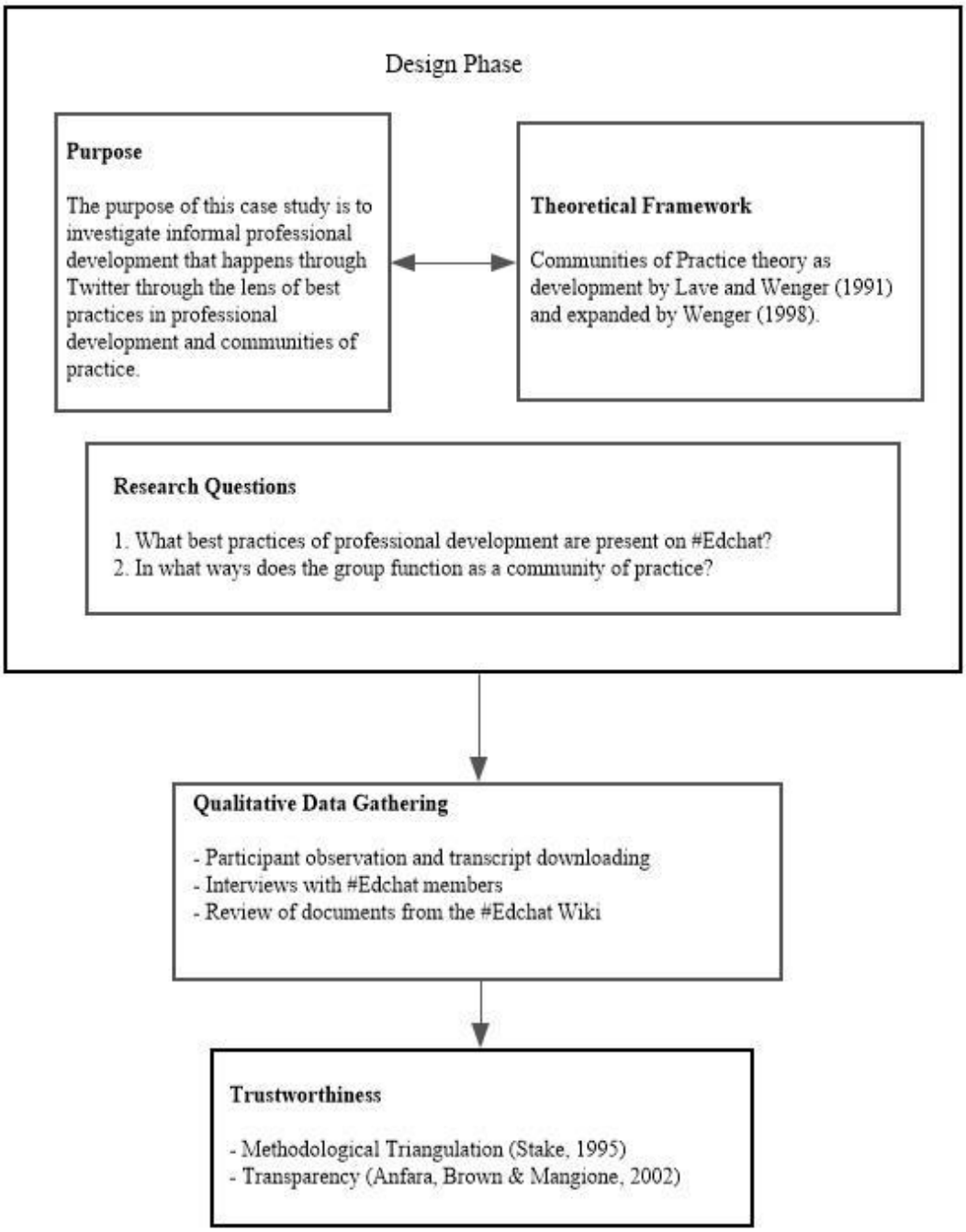


Figure 3. Flow Chart of Research Design

Sources of Data

Documents. Documents can be useful in understanding the case (Stake, 1995) as "documents serve as substitutes for records of activity that the researcher could not observe directly" (p. 68) during observations and interviews. Documents, consisting of information from the homepage and tips page, were gathered from the website http://Edchat.pbworks.com and reviewed for contextual information. This wiki website was created as an introduction to the #Edchat group for new members and includes support materials for newcomers. Each week the discussion is archived and saved on a new page within the wiki. Participants can visit the site to review transcripts of past discussions. The wiki is an open site available to anyone to view, but only those who have requested permission may post.

The documents (see Table 1) gathered from this wiki website included historical information, advice to participants, and the weekly discussion transcripts. The first document collected (Document 1) consists of the front page of the #Edchat wiki site and includes information about #Edchat, times for the chats, and other additional information. The second document collected (Document 2) consists of the tips page from the wiki site and includes tips for joining in the conversation each week and how the #Edchat got started. Overall, the information gave me a better understanding of the history of the group and how they function as a group.

Table 1

Data Collection: Documents from the #Edchat wiki

Document #	Description
1	Front page (includes what #Edchat is, who participates, times for the weekly chat)
2	Tips for a successful #Edchat

Observations. Observation data are used to get the researcher "toward greater understanding of the case" (Stake, 1995, p. 60). The overall goal of observation data is to be able to put together an "incontestable description" (p. 62) of the events that are occurring to make it available for future analysis and eventually report what is found. During observations of the weekly chat, I focused on the activities within the case that represent my research questions. I worked to "fashion a story or unique description of the case" (Stake, 1995, p. 63), and particularly looked for moments that highlighted the "unique complexity of the case" (p. 63).

As an online community, the #Edchat group presented a unique observation experience. I observed the #Edchat group for five weeks, one meeting each week, using http://tweetchat.com, a web tool that supports following a hashtag by pausing and resuming the posts. Tweetchat allowed me to enter and then follow all tweets with the #Edchat hashtag, as well as pause and start the stream of information as I took notes. Table 2 provides a list of the date and time of each chat, the weekly chat topic, the length of each chat, the number of participants, and number of tweets that were recorded. Each chat lasted from 1 hour 1 minute to 1 hour and 43 minutes, for a total of 7 hours and 11 minutes of observation.

Table 2

#Edchat chat information, including date and time, topic, length, number of participants, and number of tweets

	Date/Time	***Topic***	***Length of Transcript***	***# of participants****	***# of Tweets recorded***
1	10/22/13 7:00 p.m.	If connected educators are such a positive thing for education, why aren't all educators, or even a majority, connected?	1:29:00	503	1558
2	10/29/13 7:00 p.m.	As a teacher, if the choice was yours, would you take your school 1:1 laptops, BYOD or little or no districtwide Tech?	1:43:00	596	1566
3	11/5/13 7:00 p.m.	How do we shift lessons from teacher-centric to student-centric & should this be a priority in education?	1:30:00	609	1425
4	11/12/13 7:00 p.m.	What explanation/reasons would you offer for 1/2 of all new teachers dropping out of the profession in the first five years of service?	1:28:00	672	1811
5	11/19/13 7:00 p.m.	Is there still a fear of tech among educators that prevents them from collaboration through technological connectedness?	1:01:00	451	1127
		Totals	7:11:00		7487

*A participant is defined as tweeting once within the chat time with the hashtag #Edchat.

During the observations, I took field notes. After the #Edchat discussions were over and the transcript was available on the Edchat wiki, I downloaded the archived conversation transcripts of the #Edchat conversations. I began analysis after the first interview and observation were completed. After analyzing the subsequent data from each observation, I reached saturation, as the fifth observation reiterated the information found in earlier observations and did not provide additional information (Merriam, 2009).

Particular attention was paid to the context of the case to be able to provide the readers with a "vicarious experience" (emphasis in original, Stake, 1995, p. 63). Understanding the context is important in instrumental case studies, which for the purpose of this study, is the online environment of Twitter. The field notes and transcript analysis allowed me to see if the best practices within professional development were present, as well as to note ways in which the group functioned as a community of practice.

Interviews. Within case study research, observations and interviews are very different sources of data, yet work together to provide a picture of what has happened within the bounds of the case (Stake, 1995). Interviews are a way to investigate the interpretations of what others experience within the context of the case, and they allowed me to explore specific topics (p. 66) as a supplement to naturalistic observation data. Interviews were conducted with eight participants of the #Edchat group, and each interviewee was assigned a pseudonym. Those chosen for the interviews were selected from those who participated in any of the five conversations I observed. Table 3 includes the interview number, a list the eight participants, and a description of each participant.

Table 3

Interviewee pseudonym and description

	Interviewee (Identified by pseudonym)	***Description***
1	Connor	Band Director, new to #Edchat
2	Eddie	Weekly moderator of noon and 7:00 p.m. chat, retired educator
3	Emmett	Principal
4	Eric	High School Teacher
5	Rachel	Founder of #Edchat, weekly moderator of noon chat, informant within the study
6	Russell	Teacher, interested in gaming in education, not a regular participant
7	Scott	Assistant Principal
8	Stewart	Founder of #Edchat, weekly moderator, informant within the study, retired educator

Stake (1995) encourages locating an "informant," someone who can share information about the community and assist in locating people to interview. I started by identifying the founders of #Edchat and those who voluntarily assist in moderating the weekly conversations. This group served as informants within the research. The founders and moderators serve as voluntary leaders within the #Edchat group. It is not an official organization, so all who take on a leadership role do so voluntarily. Next, I identified typical members of the #Edchat group, those who participate weekly but do not take on a leadership role within the community. I was able to interview three leaders and five typical participants. I employed snowball sampling, a common form of purposeful sampling (Merriam, 2009), as I identified others to interview. Interview questions were developed and reviewed with a colleague. A copy of the interview protocol is located in Appendix A. The development of this interview protocol was guided by the work of Carspecken (1996). The interviews were semi-structured, allowing for "maximum flexibility

during the interview process" (p. 155). Lead-off questions were developed within the six topic domains and began the conversation. They were followed by a list of covert categories and follow-up questions. By crafting good lead-off questions, listing covert categories, and anticipating follow-up questions, all areas covered by the research questions were addressed. The lead-off and follow-up questions guide the topic of discussion while also allowing the conversation to flow into areas that cannot be determined before the interview occurs. After each interview, I followed Stake's guidance to take time to write down the main ideas and review what was said in my field notes.

After two observations, I contacted potential interviewees through Twitter, email, and/or other available contact information and arranged a mutually convenient time for the 1-hour interviews. All interviews took place through Google Hangout or Skype. Informed consent was secured at the beginning of the interview and all interviews were audio (but not video) recorded.

Interview recordings were loaded into InqScribe, a transcription software program. Transcription is a "process of construction rather than simply a matter of writing down what was said" (Hammersley, 2010, p. 556). Each interview was transcribed in its entirety, and all names given were replaced with pseudonyms. Through interviews, I gained a better understanding of how members of the #Edchat group perceived their participation. I also investigated how they talk about their participation in terms of best practices of professional development and functioning as a community of practice. I reached data saturation after interviewing the eight participants. Data analysis began after the first interview and continued on through the collection of the interview data. During the sixth, seventh, and eighth interviews, the information gathered supported the previous findings and did not add additional information.

Data Analysis

I began the study with the assumption that the #Edchat group is a place of informal professional development, though how or whether it reflected best practices or constituted a community of practice had yet to be established. This gap in knowledge guided my analysis. As I moved through the data, I looked for themes and patterns that emerged and then contemplated those themes and patterns through the lens of communities of practice theory to identify those that were present and those that were not present. I next viewed the themes and patterns within the best practices of professional development established through my review of the literature. Additional themes and patterns were viewed in relation to expanding communities of practice theory and adding to the best practices in professional development. The majority of the data analysis occurred within the Atlas.ti, version 7 software program, with close analysis of the transcripts taking place manually. A detailed description of my use of Atlast.ti can be found in Appendix B.

As Stake (2005) does not provide much structure for how to conduct data analysis as a part of case study research, I drew upon Merriam (2009) for a structured approach to data analysis. I began analysis as soon as the first observation and interview were completed. Merriam (2009) states that data analysis is both inductive and comparative. She draws heavily on the constant comparative method first proposed by Glaser and Strauss (1967) for grounded theory research, but is now "widely used throughout qualitative research" (Merriam, 2009, p. 175). I started by reading through the first data source, taking observational notes, and writing memos within Atlas.ti version 7 to capture my thoughts, reflections, and any themes that were beginning to emerge. During this first phase of analysis, I was "open to anything possible" (p.

178) that may have come from the data. After reading through the first data source, I then reviewed my initial memos and codes and constructed a list of preliminary categories.

After the first round of analysis was complete, I revisited the categories through the lens of the communities of practice theory and then within the best practices of professional development. This allowed for initial understanding of which categories fit within the indicators of a community of practice and what best practices of professional development were present, as well as those that were not. Indicators of a community of practice included categories such as sustained mutual relationships between members, a shared way of engaging in doing things together, the rapid flow of information and propagation of innovation, and the very quick setup of a problem to be discussed (Wenger, 1998). All of these, and more, are outlined by Wenger (1998) as indicators, though not mutually exclusive, of a community of practice. Best practices included the indicators of a focus on participants, extended duration, emphasis on content, opportunities for collaboration, and active learning. These indicators were identified through a thorough review of the literature on teacher professional development.

I then moved on to the next data source, engaging in the same level of analysis. I continued to create codes, memos, and categories as informed by findings from the first data source. My list of categories continued to evolve as I moved through the data sources.

The process of creating categories is highly inductive (Merriam, 2009). After processing two of the observations and four of the interviews, I then moved into a more deductive phase, looking to see if the category themes adequately represent the data. Some categories were confirmed, some were not, and others changed. After all data were collected, a period of intense data analysis occurred. After data saturation was reached, the final categories were set in

answering each of the research questions. Creswell (2013) encourages reduction to around five or six themes for use in writing the findings.

Merriam's (2009) guidance provided the process of analysis, a way to "make sense out of the data" (p. 175). This allowed me to begin to respond to the research questions I set out to answer as a part of this study. The data analysis process provided a pathway to discovering the themes that emerged, including those that supported communities of practice theory and those that expanded the theory, as well as the themes that supported best practices in professional development and those that expanded best practices within online spaces.

Trustworthiness and Dependability

Trustworthiness of the findings was established through methodological triangulation (Stake, 1995), which is the gathering of information about the case from different methods including observations, interviews, and document analysis. The data gathered from these different sources worked to provide a full picture of the case being studied. For example, interview data aided in understanding aspects of the observations, and analysis of a document lent some understanding and support information gained during an interview.

In building trustworthiness for my research, I included some of the methods suggested by the work of Anfara, Brown, and Mangione (2002). All of my interview questions, the focus of observations, and the documents collected correlated with my research questions (see Appendix C). Transcripts of the #Edchat conversations I observed, transcripts of interviews, and all documentation are available, as needed, by my committee. As I moved through the analysis process, Atlas.ti version 7 allowed me to bundle my data sources and codes to share with my committee chair. She was able to view my data and method as I worked through the steps of

analysis, allowing for full transparency of my method. The use of transparency in reporting the data and the triangulation of methods within the case study assist in the overall trustworthiness and dependability of the research.

Chapter 4

Findings

The purpose of this case study of #Edchat was to investigate informal professional development through the lens of best practices and communities of practice theory. Throughout the study, #Edchat was considered a case of informal professional development within the context of Twitter, a microblogging service and online social network. In this chapter, I will describe what happened within that space, exploring how teachers participated in #Edchat by identifying instances of best practices in regard to professional development and establishing how the group is functioning as a community of practice. The findings are presented to answer the following questions:

1. What best practices of professional development are present on #Edchat?

2. In what ways does the group function as a community of practice?

Through my analysis, I focused on how the participants of the #Edchat group participated in informal professional development and instances when they functioned as a community of practice, as well as when the actions of the community pushed beyond the confines of the theory. Teachers shared resources and participated in conversations that extended beyond the reach of the weekly chat. I was able to view how teachers used #Edchat as a part of their growth and development, as shared in the instances of best practices of professional development. Many, though not all, aspects of a community of practice were visible in the data, allowing for the exploration of additional indicators to share how this community works to support teachers in their practice, as well as some of its limitations.

Best Practices of Professional Development in #Edchat

In Chapter 2, I identified five best practices from previous research that have been shown to have the most impact on teaching practices. These include (1) focus on the participants, (2) extended duration, (3) emphasis on content, (4) opportunities for collaboration, and (5) instances of active learning. The #Edchat group functions as an example of best practices in some ways, whereas in other ways it does not. In addition, there are some characteristics of the community that could be explored as additional best practices in online professional development.

Focus on the participants. The first best practice is a focus on the participants. This means that professional development should allow teachers the opportunity to have influence over the types of activities in which they participate. The aspiration is for the professional development to fit into their life, both inside and outside the classroom. By its very nature, teachers choose to participate in #Edchat. Teachers must create a Twitter account and join in to participate, and the timing of #Edchat is such that teachers can participate in the evenings, outside the school day.

The discussion topics are chosen by the members as well. Stewart, one of the founders of #Edchat, shared:

> The one thing that we did a few weeks into it was coming up with the #Edchat poll. Very good thing. It kind of lets people know what it is we're probably going to be talking about. And we get feedback from that too. One of the things we try and do is keep the topics as relevant as possible. (Interview 8, lines 162-165)

When I asked who helps to come up with the topics to place in the poll, Stewart shared, "All me. I come up with five questions every week and . . . you don't want to keep repeating what you've done, so you try and come up with a different topic every time" (Interview 8, lines 262-263).

The founders and weekly moderators work to "keep the topics as relevant as possible" (Interview 8, line 164), stating that they are "actively involved in reading education blogs and . . . actively involved in seeing the topics on Twitter which are the relevant topics in education" (Interview 8, lines 165-166) and molding those into questions for the #Edchat discussion. After topics are selected, Stewart creates questions from the topics, making sure they will fit within the 140-character limit, allowing the full question to be posted on Twitter with the #Edchat hashtag.

When it was reported that many teachers in Europe were staying up very late on Tuesday nights to participate, their requests for an earlier time were met with the option of a noon (EST) chat. In setting up this second chat option, teachers in London are able to participate at 6:00 p.m. (their time), and those in Germany can join in the chat at 7:00 p.m. (their time). This request from the participants was received and a solution was created that met the needs of all involved.

Throughout the #Edchat, the participants are engaged in the process. Those who take on a leadership role support opinions of the participants, especially in choosing topics for discussion, the heart of the weekly chat. This inclusion of the participants is consistent with best practices in professional development.

Extended duration. The second best practice of professional development is extended duration. One-shot or short-term professional development sessions have proven ineffective, and research shows that more contact time with the material and engagement over a longer period of

time is most effective. #Edchat has met consistently since the summer of 2009, though the makeup of the participants changes frequently.

Stewart noted that the #Edchat group is one of the

> most successful chat[s] and the consistency with which we have done it is one of the things that has led to that, for, it's been up for 4 years, we've done it every single week for 4 years, uh, so people grow to look for it, they know it's there. (Interview 8, lines 50-52)

Many of the participants noted different lengths of engagement within the #Edchat group. Stewart, as stated above, has been involved since the beginning, and Rachel, another founder of the #Edchat group, noted continued participation over the years. Rachel shared, “four years later I'm a moderator" (Interview 5, line 71) "but all of us on top of our regular jobs are constantly still with Edchat” (Interview 5, line 86-87). Russell, a teacher interested in gaming, noted he does not participate regularly, stating, “I definitely come in and out, I'm definitely not regular” (Interview 6, line 113). Conner, a new participant in #Edchat, had only been participating a few months, but noted consistent engagement with the group. This dichotomy of the group having been consistent over 4 years against the fact that many participants themselves do not participate on a regular basis points toward the idea that the #Edchat group does not, in full, meet the best practice of extended duration. A face-to-face example would be a school that provides weekly afterschool PD sessions for its teachers on a regular basis. They are consistent in offering the professional development, though only a handful of teachers attend each week, and the group is a different set of teachers each time. I would not consider that professional development to meet the requirements of extended duration within the school community.

It would seem, however, that the #Edchat community has the potential to meet the duration requirement, specifically for those who participate on a regular basis. As will be discussed extensively within the communities of practice section on levels of participation, there is a small, core group of participants who do participate on a regular basis, contributing to the discussion and interacting with others. In looking at the members of the #Edchat group as individuals, a small group is meeting the requirement for extended duration. This small group consisted of 17 people who participated in all five of the chats observed. The majority of the participants did not meet the requirement. Over the five weekly chats I observed, the total number of participants was 2,354 (see Table 4). Of these, 2,040 only participated during one chat, establishing that a majority do not participate on a regular basis and do not meet the requirement of a majority to establish duration.

Table 4

Chat Participation

# of chats	*# of participants (same participants)*
5	17
4	30
3	52
2	215
1	2,040
TOTAL	**2,354**

Overall, the level of participation for the #Edchat group differed for each individual. The majority of those I interviewed did not meet the requirement for extended duration. When focusing on the #Edchat group meeting the best practices for professional development, a small handful could be considered to be following this requirement.

Emphasis on content knowledge. The third best practice is an emphasis during the professional development on content knowledge. The two dimensions that are most prevalent within content knowledge are a focus on the actual subject matter and knowledge about how students learn. In this data, the support for a focus on the actual subject matter was not present. However, the talk was focused on the knowledge of how students learn in all but one of the chats observed during the course of the research.

Connor, a newcomer to the #Edchat group, shared, "it seems like none of the topics we've had have had been content specific . . . more about general practices in classrooms" (Interview 1, lines 309-311). One reason for this is that the #Edchat group is open to teachers and educators from all disciplines and does not just pull from the field of education specifically. For example, a discussion around math concepts and best practices in Math Education could distance the conversation from those teachers who do not teach math. Another example would be a discussion focused on the role of the administrator, as that would distance those who do not have a leadership role in their schools. The topic for the weekly conversations must be one that pulls in teachers from all discipline areas and piques many areas of interest to engage them in the conversation.

Over the five weekly chats I observed, four focused on educators and discussed topics that affect teachers, such as the concept of 1:1 vs. bring your own device (BYOD) and the topic

of teacher dropout rates. The topics chosen not only focused specifically on technology in education, but came from hot topics in the field of education. This information was shared with me by Stewart, one of the founders of #Edchat, who stated, “one of the things we try and do is keep the topic as relevant as possible” (Observation 8, lines 164-165). They take suggestions from participants on topics they are interested in discussing and work to keep them current within the field of education.

Only one weekly topic focused on how students learn. “How do we shift lessons from teacher-centric to student-centric & should this be a priority in education?” (Observation 3, line 1). This conversation focused on student learning and whether this particular aspect of student learning should be a focus in education. Through this conversation, participants had the opportunity to take a step away from the classroom content itself and focus on the overall environment of the classroom.

The first few responses to the chat conversation on shifting from teacher-centric to student-centric included views such as, “We should absolutely shift to student-centered instruction. This doesn't just mean less direct instruction, but student-directed lx #edchat” (Observation 3, line 22) and “Student-centric language like "us/our/we/you" instead of "I" is a subtle way to shift the focus #edchat” (Observation 3, line 32). Within the next minute, a participant posted, “#edchat Education should always be more about learner behavior ... that drives teacher behavior” (line 35), and another replied to the very first tweet, pushing back and saying, “Should education be about teaching or learning? The answer to this decides the answer to your question. #Edchat” (Observation 3, line 44). Through this brief engagement, the participants take part in the topic of the week or content that is discussed. Through this

conversation on moving from teacher-centric to student- centric instruction, participants discussed the content of the #Edchat, presented in the form of a question that becomes the topic.

Overall, there is an emphasis on the members choosing the topics that become the content for the sessions, allowing for those involved to have ownership of the conversations. This supports a focus on the participants, as discussed earlier, as well as an emphasis on the content of the weekly chats. Eddie, a moderator, shared his views on the content by saying, "I think it's a good cross, you know with tech, non tech" (Interview 2, line 152) from week to week, allowing the weekly chat topics to focus on the content that is covered, both on topics around technology and those that do not focus on technology. He also stated that, as for topics, "flipping the classroom is popular . . . professional development is definitely popular" (Interview 2, lines 160-161). For Scott, an assistant principal, "student engagement is always going to be one . . .anything around the Common Core and pushing back on reform" (Interview 7, lines 170-171) were going to be topics of interest to him. The focus always seemed to work its way back to what is best for the students and what teachers can do to create environments for learning.

Opportunities for collaboration. The fourth best practice is collaboration, defined as the process of allowing teachers the opportunity to work with one another, sharing knowledge and exchanging ideas. Collaboration is established through sharing information, connecting with one another, and developing community. Twitter is an environment that supports conversations around collaboration, and the #Edchat group incorporated this as a part of their community, but specific instances of prolonged collaboration with other teachers did not occur within the weekly #Edchat conversations.

Through Twitter and #Edchat, Stewart, one of the founders of #Edchat, stated that "Educators have found that . . . they can use it for exchanging information and/or for collaboration in ways that are very quick and very short with exactly what they need" (Interview 8, lines 9-10). This "just in time" learning is important for teachers, allowing them to have the information they need when they need it, instead of during a training session that is removed from their classroom teaching. Though collaboration in its purest form is not present, the ideas of connection, conversation, and sharing information within the chat does provide for this just in time learning and for teachers to get what they need when they need it through their interactions with others.

One participant shows what "collaboration" looks like in #Edchat through her interactions with others. @CaliTeach (a pseudonym) participated in the third #Edchat I observed. The topic was "How do we shift lessons from teacher-centric to student - centric and should this be a priority in education?" During her 45 minutes of participation, @CaliTeach interacted with 25 other participants and sent 100 tweets.

Approximately 12 minutes into the chat, @CaliTeach sent her first tweet, stating that "the most difficult step for many teachers when becoming student-centric is letting go of control. Try it! Take a chance!" (Observation 3, line 180). During the first few minutes of each weekly chat, participants often start by making statements, asserting their opinion of the topic at hand and taking a stance. This sets up the conversations for the rest of the chat, with other participants either agreeing or pushing back against what someone says as they engage in a back and forth conversation.

Another participant responded to @CaliTeach's first statement with a question concerning administration and his/her support. @CaliTeach's original tweet was then retweeted by one of the evening's moderators. Retweeting can be seen as a way of moving the conversation forward, and when a moderator retweets, it provides the information back to the group for a second time from a leader's standpoint. A different moderator for the evening did not retweet the original statement but replied to @CaliTeach, agreeing with the statement. Moderators take on the role of both moving the conversation forward by retweeting and reminding the participants of the topic, as well as engaging in conversation with the participants. @CaliTeach then replied to another participant, and they engaged in a back and forth dialogue that lasted for three turns. @CaliTeach then moved on to engage in further conversation with another participant who commented back on the topic of administrative support. Shorter engagements occurred throughout the chat, but it is the more extended conversation with others that provides information on the aspect of a topic that the participants find most valuable.

The participant @Rome14, with whom @CaliTeach discussed administration, continued to direct statements back to @CaliTeach about how the student-centric classroom is hard to facilitate due to lack of administrative support, standardized tests, and the fact that sometimes it just does not work. @CaliTeach continually responded with very positive messages about how it could be accomplished and ended many statements with an exclamation point (!). The exclamation point could be seen as a way to pose a positive response to the more negative comments by @Rome14—perhaps to convey enthusiasm or encouragement. @Rome14 seemed to push back against @CaliTeach's statements in favor of moving to a student-centered classroom.

This conversation between @CaliTeach and @Rome14 continued on for 11 more turns when, at that point, each tweet by @Rome14 included @CaliTeach, but @CaliTeach was no longer speaking directly to @Rome14 but rather to other participants. @Rome14 tweeted six more times over the next 8 minutes and included @CaliTeach in all of his/her tweets, but was not spoken to directly by @CaliTeach for the rest of the evening's chat. By no longer engaging with @Rome14, @CaliTeach had stopped the conversation, as there was no longer a two-way engagement, and reduced its importance for @CaliTeach. This instance of not replying when directly spoken to within the #Edchat shows that the participant is moving the conversation in a new direction.

@CaliTeach also replied to a tweet by one of the founders of #Edchat at 13 minutes into her participation in the conversation (25 minutes into the chat as a whole). @CaliTeach continued to engage in conversation, tweeting every few minutes and staying very positive concerning a move to a more student-centric classroom. During this part of the discussion, @CaliTeach offered suggestions of ways to get administrators and other teachers involved in a more student-centric classroom by encouraging the observation of it in practice. @CaliTeach even disagreed directly with another participant, asking him/her to listen to his/her students within the context of the classroom. @CaliTeach was asserting her stance as positive on a move to a more student-centric classroom and seeing the role of administration as very important in that move.

At 19 minutes into the conversation for @CaliTeach (31 minutes into the evening's conversation), another participant tweeted that the student-centric classroom is normal in college and provided a link to a resource that discussed not banning technology in the college classroom.

@CaliTeach replied and thanked the participant for sending the link, however @CaliTeach did not retweet the link during the interaction. This suggests that she acknowledged the receipt of the resource, but that she had not determined its worth. I believe the act of retweeting a link establishes support for the information that is shared and gives it a value or worth in the realm of Twitter and the sharing of resources.

Approximately half-way through the chat, one of the moderators made a statement about resistance from students in a student-centric classroom. @CaliTeach replied with a positive statement that once students are invited into the activities of this type of classroom, they would become engaged. Next, @CaliTeach made a distinction between Googling information as memorization and learning, which is more than memorization, as a part of a brief conversation about questioning in the classroom and its importance within a student-centric classroom. Through these statements, @CaliTeach continued to support the idea of a student-centric classroom and provided supporting information through her tweets, though she did not link to any outside resources to support her statements. From the data analyzed, one can conclude that although this person has a strong opinion, he/she is not providing additional information to support his/her claims.

@CaliTeach then replied to someone's statement but did not include them in her tweet. She continued to end most tweets with an exclamation point (!). Another participant tweeted that many teachers do not want to participate in activities that are student-centric, specifically mentioning professional development and how teachers want to get what they need to know so they can leave. @CaliTeach replied with the statement that maybe those teachers need to rethink why they are in the profession.

Another participant tweeted a link to an article about teaching students to ask their own questions and included @CaliTeach. At 37 minutes into @CaliTeach's participation (49 minutes into the hour-long chat), a participant, @Simpson23, who had been interacting with @CaliTeach throughout the evening's chat, commented on active learning. @CaliTeach replied that when students are ready, teachers will appear. This prompted @Simpson23 to ask @CaliTeach to expand on that thought. @CaliTeach replied that they should think about it and consider if it has ever happened to them. This was the last tweet from @CaliTeach for the evening's #Edchat discussion and was the last recorded tweet using the #Edchat hashtag for the evening.

Through this example of dialogue during a Twitter chat, we can see how one participant engaged with other participants in conversation and connected with them, either by agreeing or disagreeing with their statements. We see the effects of retweeting and its ability to move the conversation forward. @CaliTeach engaged with others, but when she did not want to speak further with someone, her tweets were not responded to and virtually ignored. When making statements within #Edchat, the participants sometimes do not provide support through additional outside information, such as a link to a blog post or article. Overall, although they are not engaging in prolonged collaborating, the participants can be viewed as connecting with one another and involving themselves in conversation, as well as engaging in the sharing of resources and supporting one another along the path to improving their work.

Instances of active learning. Active learning can be defined as the participant's involvement in the learning process during activities. #Edchat supports active learning by providing a space for all those who want to be involved in the weekly chat and allowing them to contribute to the discussion. But the open nature of the medium also allows participants to

remain passive and not engage in the conversation, taking on the role of lurker and only viewing the information within the chats.

The overall Twitter environment does not necessarily support one person taking on the lead role, providing all of the information to the group as a part of the experience. To contribute to the conversation, the participants must engage in the discussion by tweeting and including the hashtag. One participant noted this idea of discussion within the first weekly chat I observed, stating, "twitter is a good discussion builder that forces people to be concise! Welcome to the twitter world #edchat" (Observation 1, line 404), while another stated, "#edchat thanks for the great discussion the hour flies . . . been a while will definitely be back more often!" (Observation 1, line 1415). Though the short space for writing supports the rapid flow of information, the need to be concise in their writing and the quick pace does constrain participants' ability to be actively involved.

Another aspect of active learning that was not found to take place within the #Edchat group's weekly conversations was the ability to put into action what is being learned. Although teachers share information during the chats, they are not able to try them out or put them into practice directly within the space. This is similar to a more traditional professional development session, where due to the absence of a classroom and students, teachers cannot put into practice what they are learning. Teachers can converse about a topic and gather resources and information to support them in the classrooms, but they are not able to put it into practice until the chat is completed. In this way, the #Edchat is more like traditional professional development that is sometimes labeled "sit and get." This method has not been found to be effective (Borko et

al., 2010), as teachers are not engaged in the material at that time nor are they able to put it into practice as a way of changing their teaching.

Literature on professional development has included a focus on best practices in professional development (Wayne et al., 2008). Through this research, five best practices emerged that have been shown to be effective in supporting teachers and their work in the classroom. Three best practices were visible through the data collected on #Edchat, including (1) focus on the participants, (2) extended duration, and (3) emphasis on content, whereas two—(1) opportunities for collaboration and (2) instances of active learning—were not.

Twitter as a Medium for Online Professional Development

One surprising finding were the responses from participants when the topic of Twitter as a form of professional development was introduced, both in observations and interviews. One participant I observed during the weekly chat made a powerful statement, saying "I learned more in a year on Twitter than my previous 14 years in education. #edchat" (Observation 1, line 437). The topic that night was "If connected educators are such a positive thing for education, why aren't all educators, or even a majority, connected?" (Observation 1, line 2). This statement of having learned so much from Twitter came from tweets such as, "I definitely think technology creates a great way for teachers to stay connected. #edchat" (Observation 1, line 435), and "Many teachers want to be experts at what they do. Knowing they aren't tech-strong, many shy away and play to their strengths? #edchat" (Observation 1, line 449). The original statement of learning more on Twitter was retweeted 11 times within the duration of the chat where it was stated, with participants adding sentiments such as "so true," "completely agree," and "I couldn't agree more."

It has been said that the Twitter environment itself attracts educators who are inclined to reach out and connect with others for professional development. One participant spoke to this characteristic, stating, "A chat about connectedness via Twitter is usually an example of preaching to the choir. We here; we're connected. #edchat" (Observation 1, line 272). This statement supports the view that the #Edchat group is a place where educators who want to connect are drawn. They reach out to one another in a similar way than they would with their fellow educators in a face-to-face situation, but through online means. The medium of Twitter allows teachers to interact with one another in an online space.

In another chat, a participant tweeted, "Tuesday night chats are my fave PD: #edchat now, and #patue at 8. Join us!" (Observation 3, line 233), specifically characterizing #Edchat as a form of professional development and encouraging others to join in the conversation. The topic for that night was on shifting lessons from teacher-centric to student-centric. This conversation focused on student learning and supporting teachers in shifting the way they design and develop lessons. In contrast to the statement during the first observation, this tweet was not retweeted within the #Edchat, nor were there any replies. This lack of response could be interpreted to mean that the sentiment was not agreed upon by other participants or that they did not feel it was an appropriate subject to join in on outside the weekly chat topic.

During my fourth observation, the topic was "What explanation/reasons would you offer for half of all new teachers dropping out of the profession in first five years of service?" (Observation 4, line 4). One participant wrote, "A number of new #tweechers from my #pln [personal learning network] pd course are participating in first chat tonight :) #edchat" (Observation 4, line 541). In response, one participant tweeted, "Welcome to all new teachers.

Don't get overwhelmed sit back and learn. #edchat" (Observation 4, line 552), welcoming and providing encouragement, but taking a more passive stance and not encouraging active participation. Another participant replied too, saying, "Thats awesome! Welcome them to twitter! #tweechers #edchat" (Observation 3, line 569). Russell, a teacher who participates sporadically in the #Edchat discussion, shared with me during the interview, "I do some professional development in my school district, and one of the courses that I've been, um, running is creating and nurturing a PLN [personal learning network] using social media. So, when I run that course, one of the activities is I have everybody engage in the Edchat" (Interview 6, lines 80-83). Russell uses connecting with teachers on the #Edchat as an activity to show teachers how to develop a personal learning network (PLN). He may use this method because it is how he developed his own PLN, and so he encourages others to connect in a similar way. Both the observation and interview data showed participants making direct connections between professional development and the #Edchat group.

In addition, participants brought up the concept of professional development before I introduced it during the interviews. Connor, a newcomer to the #Edchat, shared, "I get a lot more professional development out of the chats on Twitter than I do from my little district" (Interview 1, lines 183-184). When I asked whether or how the #Edchat group supported his development as a teacher, he noted that it was "the ideas that are thrown out . . . the things to try in my classroom . . . and that to me has been more valuable than just about anything else that I've seen" (Interview 1, lines 308-312). Scott, an assistant principal, stated, "I'm pretty active in and I use it to help expand my professional development opportunities as well. . . it's my basic premise I think it's the best professional development tool out there and it's free so why would you not

want to take advantage" (Interview 7, lines 10-14). Those who participate in Twitter chats do so voluntarily and share that they are selecting a form of professional development that supports their learning needs.

Through the interviews, participants shared the things they take away from the weekly chats. Scott shared that he got the idea of Genius Hour from the #Edchat group. He stated it "wouldn't even been something I would thought of, had I not been exposed to it before" (Interview 7, lines 238-239) and that "the classes that are being flipped in our building I think is a direct result of [#Edchat]…" (Interview 7, lines 239-240). Emmett shared that #Edchat "has helped with . . . me as a practitioner to reflect on my own professional practice [and] . . . sometimes I share out an idea [with my] staff that I've learned" (Interview 3, lines 230-233).

Through the #Edchat group, participants report support and information they need as teachers. The Twitter medium allows for the quick interaction with others and the sharing of resources. Participants report that they are able to take away information from the group that supports both them and their schools as they continue the work of educating children. Together, they view the #Edchat group as an environment that supports professional development, sometimes even in more rewarding ways than they receive from more traditional forms of professional development.

#Edchat as a Community of Practice

The #Edchat weekly discussion displayed many, but not all, of the indicators of a Community of Practice. Wenger (1998) identified three main characteristics—domain, community, and practice—and a list of indicators to use when identifying a community of practice. In addition, community of practice theory discusses the levels of participation for

members and how newcomers enter the community through legitimate peripheral participation. Within the data, many of the characteristics and indicators were visible, but others were not present at all. Below, I will discuss the characteristics and indicators that were and were not present. I will also explore the levels of participation and legitimate peripheral participation. In conclusion, I will introduce additional aspects of the #Edchat group that could support community of practice theory.

Characteristics.

Domain. The first indicator of a community of practice is that of the domain, or the shared interest that brings together the members of a community. The #Edchat community is focused on topics in the field of education, those topics that are the most relevant to education at the time of the conversation. Examples of topics covered during my observation were:

- If connected educators are such a positive thing for education, why aren't all educators, or even a majority, connected?
- How do we shift lessons from teacher-centric to student-centric and should this be a priority in education?
- Is there still a fear of tech among educators that prevents them from collaboration through technological connectedness?

Within the weekly chat, the moderator always tweeted the topic multiple times, keeping the focus of the group on task, as well as providing the topic to participants as they joined in. The topic was often retweeted again approximately halfway through the chat, continuing to move the direction of the chat back to the topic and to focus the participants. During my second observation, the moderator tweeted, "#edchat Topic: As a teacher, if the choice was yours, would

you take your school 1:1 laptops, BYOD or little or no districtwide Tech?" (Observation 2, line 4), sharing the topic for the evening and engaging others in conversation. This process was repeated each week with the moderators sharing the topic of the weekly chat.

Through the Tips page of the #Edchat wiki site, one encouragement for those who participate or are new to the chat is to "propose questions to be discussed on the Educator PLN Ning group" (Document 2). During the week, between the chats, Stewart noted that "#Edchat has been adopted as the hashtag that people add on to tweets of an educational nature . . . it's become a hashtag for education" (Observation 8, lines 60-62). The shared interest in the field of education and the desire to grow as educators is a part of what brings people together week after week.

Community. The second indicator is community. In general, Wenger (1998) argued that community is created once people who are working toward the same domain interact with one another by sharing information, participating in activities, and assisting one another as they build relationships. When asked about how #Edchat got its start, Rachel, one of the founders, shared:

> It actually began 4 years ago in August . . . Stewart and I . . . were on social media and I was . . . teaching in Germany at the time. Stewart DM'd [direct messaged] me and said there are so many arguments going on Twitter, like discussions and debates. And he says you know I have so many a day and I really need a way to categorize it and get everybody to be on one . . . so he said how can you do that? and I said well, a hashtag and so then he said that's a great idea and he hadn't heard about hashtags and I told him what they do and then he's like well can we get this as a regular thing and I said yes of course .

> . . so [we] came up with #Edchat and that's how #Edchat was born. (Interview 5, lines 32-45)

Since its founding in the summer of 2009, the chat itself has occurred every week, although the number of participants in the weekly chat has grown and changed. Participants, or those new to the group, can rely on the members of #Edchat to gather each Tuesday evening to discuss a topic in the field of education. They can also go to these people for assistance at any time during the week for advice. The #Edchat meetings remain consistent in the way they operate each week, even if the members who participate each week change. This interaction on a regular basis assists in establishing the community. Within communities of practice theory, there are varying levels of participation for those who join in each week, which will be discussed later.

The consistency with which #Edchat has been executed gives teachers a place to go regularly to express their feelings, share information, and learn from one another. Stewart, one of the founders of #Edchat, stated it best when he said:

> Yeah it is, see #Edchat was, I don't know if #Edchat was the first chat to be on Twitter but it certainly was the first most successful chat and the consistency with which we have done it is one of the things that has led to that . . . we've done it every single week for 4 years, uh, so people grow to look for it, they know it's there. (Interview 8, lines 49-52)

The shared experiences of the members of the community can be explored through instances when members of the #Edchat community meet in face-to-face environments, such as at a conference. One participant noted, "It was just wonderful meeting the people who, you know, you connect with on Twitter" (Interview 2, lines 171-172), and another shared that he met someone from Twitter "at a conference that we both were invited to" (Interview 3, lines 84).

Rachel, one of the founders, shared that "all of us probably about at least about once a year do a presentation or we do an in house #Edchat, sometimes like at ISTE, where we get to and then different conferences we actually get to go and show it to teachers who are there and they get to be part of the real #Edchat" (Interview 5, lines 69-72).

The community that is being built through the #Edchat hashtag includes teachers and educators from all realms engaged a common conversation. Their experiences in the chat allow them to interact with one another in online spaces that sometimes transfer to face-to-face interactions. The sharing of information, participating together in activities, and assisting one another as they build relationships can be seen within the chat and is explored further in the examination of the indicators, especially sustained mutual relationships and the rapid flow of information.

Practice. The third characteristic is practice, which is expressed through a shared repertoire and experiences of the members. Through the #Edchat wiki (Document 2), tips are provided that assist those participating in the weekly chat. This information establishes a shared repertoire, including information on voting on the weekly topic, joining in the conversation, and suggested tools to help with participating. In addition, it encourages those who participate to "engage in conversations with a few by replying to their tweets. Use the @username to reply to one or many in the same tweet. If a person doesn't respond then reply to another person or your moderator" (Document 2).

Eddie, a moderator with #Edchat, stated in his interview that he liked "to share the information I have with others. [#Edchat is] a great vehicle to do that" (Interview 2, line 12). He noted that "You learn from them, what's working and what's not working in their classes,

schools" (Interview 2, lines 211-212). Rachel, one of the founders, stated, "and then I get to share those ideas with the other teachers and, you know, for me, as I want to be in the top of my game" (Interview 5, lines 289-290). By communicating their experiences, the teachers extend their knowledge and assist one another in their teaching.

The experience of the practice of #Edchat is explored further through the indicators of a community of practice, especially those of rapid flow of information and the quick setup of a problem to be discussed. Through the experience of the weekly #Edchat, teachers, administrators, and other educators experienced the speedy exchange of information and were able to interact with others. This practice, together with domain and community, provide the essential pieces in the building of a community of practice.

Indicators. Within the data, I found support for many, but not all, of Wenger's (1998) community of practice indicators. I found instances of (1) sustained mutual relationships, (2) rapid flow of information, (3) absences of introductory preamble, (4) quick setup of problem to be discussed, and (5) substantial overlap in participants' descriptions of who belongs. Indicators that were not present included (1) knowing what others know, what they can do, and how they can contribute to an enterprise and (2) a shared discourse reflecting certain perspectives on the world.

Indicators Present.

Sustained mutual relationships—harmonious or conflictual. One of the indicators of a community of practice is sustained mutual relationships—harmonious or conflictual. The #Edchat community was founded by educators who continue to participate each week in the discussions, growing and nurturing the community through ebbs and flows. One founder stated,

“all of us on top of our regular jobs are constantly still with #Edchat” (Interview 5, lines 86-87). The community has consistency in its leadership, which is a strength in growing the community.

When those who participate are involved over a prolonged period, they begin to identify the people who are the regular participants of the #Edchat. Eric, a high school teacher, noted “because I've been more active, I've been able to see who the more frequent users are and because of that you kind of get to see who comes in and who comes out” (Interview 4, lines 69-70). Another participant, Russell, noted that “I'd say [the #Edchat group] . . . is quite sustainable where many things these days like that are not, um, and I think with that hashtag being used kind of around the clock, I think it's kind of kept things going” (Interview 6, lines 104-106). When asked about changes within the leadership of #Edchat, one participant noted that there is “not a whole lot. You've got your basic people who seem to be on there all the time” (Interview 1, line 63), while another shared, “it's basically the same core people” (Interview 2, line 41).

Overall, the “core of [#Edchat] has stayed the same . . . so it has the same feel overall, um, obviously there are, you know, people who come in, you know, like gang busters are all excited and promptly drift out and all that” (Interview 6, lines 94-96). For the most part, those who voluntarily take on leadership roles and responsibilities within the #Edchat community do so on top of their regular jobs. Rachel, one of the founders, shared, we “are constantly still with Edchat and we moderate every Tuesday kind of help with all of that. . . really incredible people stand up and become really part of the #Edchat family” (Interview 5, lines 86-89).

During one week’s chat, one participant tweeted, “#edchat #edtech Special request from my online friends for good thoughts as I have a health crisis in my immediate family. Thanks in advance” (Observation 5, line 4), with a reply from the moderator, “Our thoughts and prayers are

with you during this difficult time. Twitter educators are a caring community. #edchat" (Observation 5, line 22). In another example, a participant tweeted, "Love this! #networking #edchat" (Observation 3, line 1097), speaking to the idea of networking and connection, and linked to an image with a quote that shared the idea of connection through social media, stating how they could respond as quickly as a teacher in your building. This statement was quickly retweeted by another participant. These interactions showed a connection between those who participate that went beyond brief interactions on the weekly chat and showed the development of a community for those who chat each week.

Regular participants in the #Edchat weekly chat are the ones who keep coming back week after week. The indicator of a sustained mutual relationship encompasses the reasons why they continue to participate. In observing the weekly #Edchat conversations, I noticed that many people came in and out of the weekly conversations, as indicated through the level of participation noted above. Most of the people I interviewed were somewhat regular in their participation in and contribution to the conversations. They also tweeted with the #Edchat hashtag throughout the week, not just on Tuesday nights. During my interviews, one question I posed to each of them was "What keeps you coming back each week to #Edchat?"

Connor, a newcomer to #Edchat, shared that it was "curiosity, I think definitely curiosity, you know what's the topics going to be" (Interview 1, line 178). Eddie, one of the moderators, shared that for him it is

> the exchange, I think it's wonderful to share the information, to learn from others, I'm a constant learner and I like to hear different points of view. I may not agree with them but

> sometimes you look at them and you realize, hey, that person's right, they have a good point you don't realize. (Interview 2, lines 118-121)

In his interview, Eddie shared that he is a part of a collaborative project with a group of fourth grade teachers. He divulged that "Twitter . . . brought us together to learn, share and collaborate with one another" (Interview 2, lines 17). For Eric, a high school teacher, "what keeps me coming back is knowing that those connections are available to educators, but only if you are willing to be open to making the new connections" (Interview 4, lines 139-140), communicating that it is not only the effort to show up each week that counts, but to come with a mindset of openness to what could happen.

Rachel, a founder of #Edchat, shared that "it's really the people [that] really energizes you and it's great, one of the great things about #Edchat is . . . we talk about tough issues in education, we don't talk about issues that are not gonna, not gonna get people not to notice" (Interview 5, lines 263-265). Rachel then provided examples of the tough issues, saying, "We talk about schools and why they waste time in professional development that doesn't relate to teacher, we talk about not having grades, we talk about why, uh, things like standardized testing should go away completely" (Interview 5, lines 266-268). For Scott, an assistant principal, it was his ability to

> learn something new to help somebody else learn something new. I think my job as an administrator is to enhance teachers knowledge and enhance teachers ability to do a good job with their kids and I think Twitter allows me to extend that beyond the four walls of my building and my teachers and to other people. (Interview 7, lines 128-131)

Russell is not someone who participated each week, but he shared that when he does participate he feels "invigorated. Um, you know it's easy to kind of, like, get in your own little bubble as a teacher and then when you're out there in this community and you kind of get excited about a discussion and involved" (Interview 6, lines 168-170). His feelings were echoed in Stewart's statement as to why he believed the #Edchat attracts so many participants who continue to return: "people are hooked on it because it's, they're able to do on Edchat what they can't do in their own schools" (Interview 8, lines 235-236). He extended this statement by saying that #Edchat allows for

> Open, candid, transparent discussions about topics that are relevant to [teachers] and they get to see what other schools and other educators are thinking about the same topic. You've got to realize that too, for too long education has been isolated, you knew what went on within your building . . . So, #Edchat is open to everybody at any time and the more teachers we get connected, the more teachers . . . learn about #Edchat. (Interview 8, lines 245-253)

But I feel Emmett, a principal, summed it up best by saying that for him

> it's conversation. You get to engage other passionate educators in a conversation about education . . . and I think . . .when you don't have an opportunity to sit down and engage other passionate educators, #Edchat is an excellent opportunity to do that, and that's sort of what I would look forward to week after week, was to engage other educators in a conversation. (Interview 3, lines 99-104)

Each person I interviewed spoke to the reasons why they continue to participate, week after week, in the #Edchat group. Though the responses varied among this group of eight, their

overall statements supported the indicator of a sustained mutual relationship. The participants also were able to speak of those who make up the core group, those who continually support the work of #Edchat and encourage those who participate each week.

The rapid flow of information and propagation of innovation. One factor that many newcomers to #Edchat noted is the speed of the conversations each Tuesday night. Approximately three to four tweets are sent every second during the weekly #Edchat (calculations revealed between 2.9 and 3.9 tweets per second). One participant noted, "The chats are just absolutely ridiculously fast" (Interview 1, lines 48-49), while another shared, "It's kind of overwhelming for a new person on Twitter" (Interview 2, lines 44-45). When speaking with Russell, who teaches a course that incorporates having new teachers participate in #Edchat, he noted that for many, "the first time there's a big sense of overwhelm and then it eases a little bit" (Interview 6, lines 140-141), and some are willing to try again. Stewart concluded by saying, "As an educator we need sources . . . and Twitter enables us in a very quick link to send that information out to people, to exchange that information and it also allows collaboration" (Interview 8, lines 11-14). The space of Twitter encourages the rapid flow of information and an easy sharing of online resources.

One other feature that encourages the quick exchange of information is the limit to the number of characters allowed in each post. Twitter allows for 140 characters to be sent, requiring those who share information to shorten what they might say through another medium. The character limit encourages people to get right to the point in what they have to say. Connor said, "If I can't get my ideas out in 140 characters, then I don't know what I'm talking about" (Interview 1, line 76-77), while another shared, "It's a great challenge for me because it forces

me to say what I want to say, you know, and get the point across concisely" (Interview 6, lines 45-46). Another participant noted that putting your thoughts into 140 characters is "a higher order thinking skill to look at something and then you've got to summarize and put in different words and in order to max the character" (Interview 5, lines 117-119). Although when asked about having to make sure to only use 140 characters, one participant stated jokingly that the experience was "awful" (Interview 4, line 77), as he considers himself more verbose in his writing.

The medium of Twitter and the constraint of only 140 characters can be viewed as a limitation. It does not allow for more lengthy statements within the weekly conversations, nor for detailed explanations of information that is shared. This limits the depth of exchange that is possible within #Edchat, but still meets the requirement of the rapid flow of information viewed in communities of practice.

One of the biggest components of #Edchat that was visible during the observations was the number of resources shared between the participants. These resources came in the form of advice on topics raised, links to additional information, and tools that support the process of teaching and learning. Rachel, one of the founders and weekly moderators, stated, "[#Edchat] gives me new ideas all the time and I always find different tools and it makes me very excited" (Interview 5, lines 417-418). She also loves when teachers share tools and resources their students have used, as she gets ideas from what others are doing in their classrooms.

One week's topic was a discussion around 1:1 computers versus Bring Your Own Device programs. One teacher shared advice that "schools shouldn't focus on the device or the pithy title of 1:1, but rather access & opportunities for creation & learning #Edchat" (Observation 2, line

196). One reply to this statement was “I think that simple expression says a lot. What is important is what comes after, but you say a lot to your Ss w 1:1 #edchat” (Observation 2, line 225), while another shared his/her own experience, stating, “In my experience, 1:1 provides far more opps. for creating, learning, exploring, passions, connect Plus, greater device care #edchat” (Observation 2, line 246). These educators shared resources with one another in the form of their own opinion, supported by their experiences, and pushed beyond the topic of BYOD and 1:1 propagating new ideas within the field. This line of conversation ended with one of the moderators commenting, “We need more educators like you [referring to the original post] to show staff how to properly use tech. #edchat” (Observation 2, line 779). This sharing of opinions encouraged the conversation as it moved forward within the chat.

During the third chat I observed, another teacher shared resources that could be used in the classroom. During the discussion on student-centric vs. teacher-centric classroom, one participant tweeted, “But don't we need to be able to describe it in common language in order to facilitate change? #Edchat” (Observation 3, line 517), and the other replied with, “I think so. Just saying that any list describing a student-centric classroom will be lengthy. Lots of possible ingredients #edchat” (Observation 3, line 588), and a third educator jumped in and stated, “This school is a great model of student-centered learning: http://t.co/jMp595z2St #edchat”, sharing a link to the website for a charter school. The reply was “Thanks [name]! Appreciate the link! #Edchat” (Observation 3, line 593). This rapid flow of information took place within 3 minutes of conversation, quickly setting up a problem and finding resources that assisted and supported further discussion. The Twitter environment supported the questioning and responding and

allowed for others outside the one-on-one conversation to step in and share information to assist, without explicitly being asked for that information.

During one weekly chat, a participant tweeted, "Looking for world history lesson plans/suggestions that are student centered? #edchat" (Observation 3, line 221), and a response was provided, stating, "Work backwards using current events and tie threads to world history. Connecting now w/ then sticks. #edchat" (Observation 3, line 284). This response encouraged the teacher to take events that are happening today, that may be better understood by the students, and tie them to the events within world history. This connection between today and the past helps the students to learn and remember what they have been taught. Overall, this exchange provided the teacher with information he/she could take back to his/her classroom and put into practice during a future lesson.

In analyzing my observation notes, I noticed that I often wrote about the sharing of resources. One comment I made stated, "most tweets have a link in them - not too much just posting, mostly sharing," and I made the comment, "sharing of ideas - things teachers can take back to the classroom, even lurkers can get a LOT from the chat. Archives of chats assist as well - pulling down the information." Each week, countless lurkers observe the chat without participating, and each weekly chat is archived on the #Edchat wiki. Anyone can visit this site to read what others have said on a topic and to locate links to resources and tools to support him/her in the classroom.

Stewart, a founder of #Edchat, felt that the sharing of resources through social media has "become a real game changer for personalizing our learning . . . developing a personalized learning network where . . . other educators actually become sources for your information"

(Interview 8, lines 23-25). He argued that "as educators begin to . . . develop their sources . . . [they] start . . . network of people to whom [they] can send information and receive information" (Interview 8, lines 28-29), becoming a two-way street where people share and gather resources to take back and use within their teaching and learning. This assertion was echoed by Eddie, a moderator of #Edchat, who stated, "I'm getting great information, great insight, great ideas, how else can you get all this information" (Interview 2, line 234-235) and also shared, "you learn from [other educators] what's working and what's not working in their classes, schools" (Interview 2, lines 193-194).

The statements from members of the #Edchat on personalized learning brings up the concept of a Personal/Professional Learning Network (PLN). Through a PLN, individuals connect with others who they feel can share information and who they can learn from in times of need. Often, teachers reach out to their PLN when they need resources for a lesson or help with a classroom management issue. Instead of waiting for a more traditional professional development session or attempting to find resources and support from others in their building, they will reach out to members of their PLN, often through a social networking site such as Twitter. They are able to receive quick feedback and assistance as they resolve their need.

Russell teaches a course to other teachers in his district and uses the #Edchat as a way to introduce others to the concept of connecting with fellow educators and creating a Personalized Learning Network or PLN. He stated, "When I teach that course, I mean, I think it's a great way to introduce people to what's possible out there and how, you know, I think you know especially educators that aren't, um, you know, involved in a PLN yet don't really understand that there are

so many active educators out there communicating on a regular basis" (Interview 6, lines 168-171).

In the #Edchat, teachers shared what was going well in their classrooms and pointed other teachers toward information to support them in their work. Twitter may make it easier to share resources, as there is such a small amount of space for saying what you need to say. Within 140 characters, it is often difficult to share a large amount of information on a topic, and it is easier to link to a blog post or website that shares more information on a topic as a way to convey meaning. During the first observation of #Edchat on the topic of being a connected educator, one participant shared that he is able to balance his two worlds and included a link to his blog and a post where he wrote about being a connected educator. In the third chat, one of the moderators shared resources from his website with links and information to support the evening's topic on moving to a more student-focused classroom.

A majority of the links provided within the #Edchat weekly chats were to blog posts, webinars, resource pages, and more mainstream publications. These links provide additional information for the participants during the weekly #Edchat, and many links are shared throughout the week between chats. But a great number of these links are not scholarly in nature and often link to opinion information through blogs and articles in popular publications.

This type of sharing of resources supports the rapid flow of information and propagation of innovation, an indicator of a community of practice. It is almost expected that people will share links to blog posts or articles, especially outside the weekly chat, with the community as a whole. This supports the indicator of how a community of practice has a shared way of engaging

in doing things together. In addition, this is also a great example of the rapid flow of information and propagation of innovation.

Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process. The #Edchat conversation in some ways continues from week to week, with members using the #Edchat hashtag with posts between chats. It is as if the conversation began 4 years ago and has been continuing on since that time. Though the topics change and the conversations move off in many different directions, the conversations seem to never stop.

As new members join the group, they often introduce themselves the first time they join in weekly chat. A couple of examples of tweets sent are "joining in on the #edchat discussion tonight" (Observation 1, line 3) or "#edchat good evening from Alberta, Canada" (Observation 1, line 16) and from someone participating the first time: "Excited to see what a live #edchat is all about!" (Observation 1, line 52). But, only the new participants tweet an introduction. Those who participate on a regular basis do not introduce themselves, treating the chats as a continual conversation.

The #Edchat hashtag is not just used on Tuesday nights for 1 hour during the weekly chat. It has become one of, if not the hashtag, to include on educational tweets throughout the week. Stewart, one of the founders, states:

> so, what's happened with #Edchat is that it extends the range of educator's tweets to thousands of educators. So #Edchat has been adopted as the hashtag that people add on to tweets of an educational nature, so it's become more than just a chat it's become, it's become a hashtag for education. (Interview 8, lines 61-64)

Eddie, one of the moderators, shared, "I'm getting great information, great insight, great ideas, how else can you get all this information, there's so much out there, tech is moving so fast, you're getting information via #Edchat and other, um just being a part of Twitter" (Interview 2, lines 234-236).

The idea of #Edchat as a home base and a gateway was sparked through the interviews. #Edchat was where most got their start in using Twitter to engage with other educators and began to grow their network as a connected educator. From there they moved into more specific chats that fit into their specific interest area within the field of education or possibly the region or location where they live. Examples included a first grade chat for those teaching first grade, gaming in education chat for those interested in gaming, Teach like a Pirate chat for those who read and follow the work of Dave Burgess, and Florida Ed chat for those who live in Florida. Some participants stay with #Edchat, some move into participating only in the other chats, and some make a point to do both. But #Edchat serves as a home base and a hashtag to connect with the community at large. Because conversations seem to continue as a part of the ongoing process, the group exhibits this indicator of a community of practice. Those who participate often return to the #Edchat, even if they get involved in other chats that support a more focused area of interest.

Many of the #Edchat participants take part in other chats that happen during the week, with one person I interviewed (Eddie) stating, "I do participate in a lot of chats - I'm a chat-a-holic" (Interview 2, lines 11-12). Emmett, a principal, also shared, "various kinds of chats that go on, they tend to be, uh, for they tend to be a lot of fun because you can actually engage people and ideas and thoughts about education" (Interview 3, lines 11-13). The #Edchat weekly chat

focuses more on the broader topics in the field of education. Since #Edchat was established, many other chats have emerged, focusing on more specific groups of educators. These chats pull people together by subject, grade, or physical location.

The #Edchat group is one of the more popular chats and draws many people into the world of Twitter and educational chats. I think of #Edchat as a gateway, bringing people into the possibilities of the interaction available through Twitter and then allowing them to find the smaller group of individuals with whom they can connect over a shared interest. Russell, one of the participants I interviewed, shared that he does not participate as much anymore in the #Edchat group. When he first started using Twitter, he stated

> I guess I just kind of gave it enough of a chance that time and did find things like #Edchat and the people involved in #Edchat and I guess, um, I started to really get intrigued by what these, you know, people were doing and it was becoming inspirational and . . . invigorating. (Interview 6, lines 9-12)

From there, he moved into a more focused area, stating

> my real interest is a little more fine-tuned and I'm very interested in game-based learning and so I've been on Twitter for a few years and started with general education and then really started finding the people that are more, uh, likeminded in terms of the game-based learning stuff and video game design. (Interview 6, lines 13-17)

Russell's experience supports the argument that those who come to Twitter and participate in weekly chats often begin with a more general educational conversation and move to more specific chats that support their interests. Though Russell has found a group that supports his focused interest in game-based learning, he continues to return to the #Edchat. Through his work

with teachers, he introduces them to the chat and engages back with the group when he can. When he returns, he is able to join in the conversation as if he never left. There is no need to reintroduce himself, and he is able to continue in the conversation. In addition, he can include the #Edchat hashtag in his posts about game-based learning as a way to continue in the conversation of #Edchat while also focusing on his specified area of interest.

Very quick setup of a problem to be discussed. As stated previously, the weekly topics are proposed by members of the #Edchat group and formed into questions. Topics are presented in the form of questions, and the majority take up ideas that are considered problems in the educational system. These questions are posted on a Twitter poll on Sundays, and the poll closes on Tuesday mornings. The topic that receives the most votes is the 7:00 p.m. chat topic, and the topic that receives the second highest number of votes is the noon chat.

During the interviews, I asked the participants about the topics and the setup of the weekly chat topic. Stewart noted that originally the topics were chosen at the time of the chat and evolved into the use of a Twitter poll to provide input from participants. Stewart stated, "rather than me just coming up with a topic on the spur of the moment, we figured we would put out a poll, so we started putting out a poll on Sunday with five topic choices and people vote on them" (Interview 8, lines 102-104). Emmett shared that "the topics, they're pretty steady, I think sometimes the topics do get kind of redundant, when they same things over and over again which, you know, is good or bad" (Interview 3, lines 60-61).

This rapid setup of the topic to be discussed occurs each week under the direction of the founders and moderators. This quick setup of the problem, or topic, that is discussed each week allows for conversations around the most relevant and popular topics of the moment. In addition

to topics that are popular at the moment, the #Edchat takes the time to discuss overarching topics and discuss items that have been a part of education conversations for years, such as homework and testing.

Substantial overlap in participants' descriptions of who belongs. Weekly #Edchat participants come from many roles within the field of education. These roles include administrators, researchers, government officials, legislators, and, most of all, teachers. The participants I interviewed for this research study fell within the roles of retired educator, teacher, or school administrator (see Table 3). The #Edchat weekly discussion focuses on topics that would be of interest to teachers from all discipline areas, as well as leaders and those in educational roles outside a school building. Through this focus on topics in education, they pull in those who show interest and wish to contribute to the conversation.

During the interviews I asked each participant to tell me about members of the #Edchat community. Almost all of the participants identified Stewart and Rachel, two of the founders, as well as Eddie, one of the weekly moderators, as prominent members. This points to their continued engagement in the group and establishing themselves as people who belong in the chat each week. In addition, the respondents identified the two other moderators and additional founder of #Edchat as people within the #Edchat community. This identification of the core group as prominent members of the #Edchat establishes those who are a part of the weekly operations of the chat. Participants see them as leaders who support the members of the community.

In the weekly chat transcripts it was evident that participants engage with one another and the moderators. At the end of one night's chat the moderators thanked everyone for participating.

One participant noted “Great #edchat tonight! Thanks [moderator]” (Observation 1, line 1407). This supported what one participant stated, that “it's basically the same core people” who are present each week, including those who fit into the role of moderator.

This overall knowledge of the leaders within the #Edchat group adds stability to the weekly conversations and yet allows for variance in leadership. Stewart, one of the founders, stated that the membership has “varie[d] over the years, there have been people who have been on for a few weeks, a few months and then they drop off, but it takes drop offs and returns. #Edchat fits into people's schedules sometimes, and sometimes it doesn't” (Interview 8, lines 202-204). The ebb and flow of the weekly chat participants moves like that of a river, with people moving in and out. But, overall they have a strong team of leaders who provide stability and consistency. Those I interviewed knew who belonged in the list of “heavy hitters” who lead the chat each week.

Levels of participation. During my observation, I observed one chat each week for 5 weeks. From the transcripts of the weekly chats, I tallied the number of unique participants that tweeted during each chat and how many total people tweeted during the chat over the 5 weeks. Of the five chats I observed, a group of 17 people participated in all of the chats in all 5 weeks (see Table 4). This group of the same 17 people who were present each week during the #Edchat and participated in the conversations represents the core group within #Edchat. The numbers rise from there, with 30 individuals participating in four of the five chats, 52 participating in three of the five chats, 215 participating in two of the five chats, and 2,040 participating in only one of the five chats (see Table 4).

Wenger (2011a) states that communities of practice consist of people participating at differing levels. Through my observation, I placed the 17 people who participated in each of the weekly #Edchat, along with the moderators and the founders of #Edchat group, within the core group of the #Edchat. Those who participated in four of the five chats fit into the active participants group. Those who only participated two to three times fall into the occasional participant group. Last, consideration is given to the 2,040 people who only participated once during the 5 weeks of observation. This large group consists of those on the periphery of the group, as well as beginners, those who are new to the #Edchat group and are just beginning their experience and participation. This group consists of those who tweeted at least once during the 60-90 minutes of the #Edchat, but did not necessarily participate in the conversation.

The large group of participants (2,040) who tweet using the #Edchat hashtag during the weekly chat hour do not necessarily participate in the chat topic itself. This supports the idea that the #Edchat hashtag has become a "hashtag for education" (Interview 8, line 64). Stewart noted this during his interview, saying, "So #Edchat has been adopted as the hashtag that people add on to tweets of an educational nature, so it's become more than just a chat, it's become, it's become a hashtag for education" (Interview 8, lines 62-64). Within the weekly chat, as well as during the week, a number of tweets are sent on the topic of education using the #Edchat hashtag. Two examples of tweets sent out during the #Edchat conversation that are not a part of the weekly topic of conversation were "1 reason Latinas dropout of HS = to help family. What other ways can they help family w/o dropping out? #Edchat http://t.co/eym2yQFuLU" (Observation 2, line 148), while another stated, "For affordable teaching resources, check out my store http://t.co/6xsb2zf66F #edchat #homeschooling #homeschool #mathed #teacherspayteachers"

(Observation 3, line 1215). The first example includes only the #Edchat hashtag, making it visible to those following the #Edchat hashtag and pushes that information to those who participate in the weekly chat. The second example includes a number of hashtags, thus widening its audience on Twitter and providing the information to a larger group of people.

In support of this observation, the interviewees also noted many different levels of participation during the weekly chat, ranging from weekly to only sporadically, as time provided. Eddie, one of the moderators, was the only person I interviewed who participated during all five of the weekly chats. His level of participation, from the five established by Wenger (2011a), would be that of a member of the core group of the community. Eddie said, "Yeah, I moderate the Tuesday chats - the noon chats and the 7pm EST chat, along with my other co-moderators" (Interview 2, lines 34-35). A self-proclaimed "chat-a-holic," Eddie participates in chats each day of the week. Stewart, one of the founders, shared that he participates weekly at both the noon and 7:00 p.m. chats, although he was present for only three of the five observations I completed. Both Eddie and Stewart are retired educators and participate in #Edchat as a way to stay connected to the field of education.

Rachel moderates the noon chat, and therefore does not participate in the 7:00 p.m. chat on a regular basis. She was present only for two of the five chats I observed, and I consider her level of participation within the 7:00 p.m. #Edchat group to be an occasional participant. For the noon chat that was not observed for this study, she would be considered a part of the core group. Rachel teaches online courses and works with teachers, so through her job flexibility, she is able to continue to moderate the noon chat each week. As we discussed her role in the founding of

#Edchat and her participation now, she stated, “Four years later I'm a moderator” (Interview 5, line 71). These three participants considered themselves to be consistent in their participation.

The additional people that I interviewed noted different levels of participation. Russell currently participates the least, noting that he only participates on a sporadic basis in the #Edchat weekly discussions now. He stated, “I definitely come in and out, I'm definitely not regular, so you know with all of the other things that I'm involved in” (Interview 6, lines 113-114). When asked about his current level of participation, Eric, a high school teacher, stated, “I was up until this year, and I started teaching higher level courses and it's eaten a lot of my time, uh, but I would say I'm more than an average user” (Interview 4, lines 64-65).

Connor has been participating in the weekly #Edchat for the shortest amount of time, compared to the others, but shares that he participates each week if he can. His level of participation would be labeled as an active participant. Connor shared that after his wife discovered the #Edchat weekly chat they “just decided to jump on one night we were instantly hooked as far as what was out there and what was going on and that was probably end of August, beginning of September [of 2013]” (Interview 1, lines 36-37). Connor also shared that he “started off as a lurker but now I try to jump in and be part of the conversations as much as I can” (Interview 1, lines 46-47). Of the other participants I interviewed for this study, Stewart would be a part of the core group, whereas Scott, Emmett, and Eric move between active participants to occasional participants of the group. I would consider Russell’s level of participation to be as a peripheral participant. He shared that he does not participate as often and was even surprised that I contacted him for an interview because of his infrequent involvement. Overall, other than the core group members, each person I interviewed stated different levels of

participation, and he/she moves between the different levels as a part of the engagement in the community.

As more of a casual participant myself, when I do participate it feels like there is a large number of people each week, but, truthfully, there is just a small core group who take part with regularity. A much larger number, over 2,000 people, only participate once in the weekly chats over time, and most of those posts are not related to the topic of conversation. As a participant, it can be hard to sift through the chatter and get to the heart of the conversation and really connect and share with others.

One theme that stood out when moving through the data was that participants feel that they are assisting one another during the #Edchat meetings. This concept supports legitimate peripheral participation, one of the key aspects of communities of practice theory. One of the participants shared, "we always get new people involved on #Edchat although it's kind of overwhelming for a new person on Twitter" (Interview 2, lines 48-49).

When the actual conversations are happening, the moderators and others involved in the chat assist those who have questions and are just getting started. I observed people who asked if the chat had begun and someone replied, "Not started yet. yes just search #edchat and you will see the moderator posting soon, which marks its starting point" (Observation 1, line 7), while another tweeted, "do a Twitter search for #edchat and follow along :)" (Observation 4, line 6). Another helpful aspect is the tips provided on the #Edchat wiki on a dedicated page to support participants, whether new or experienced. This page on the wiki includes tips to assist in proposing questions, voting on the topic, and suggested applications to assist with joining in the weekly chat.

Lurkers, those outside the #Edchat group, also have a place within the #Edchat. One participant, Russell, who is interested in game-based learning, shared that he was surprised that I found him to request an interview. “I kind of find it interesting that you found me specifically” (Interview 6, line 114). Russell shared, “I definitely come in and out, I’m definitely not [a] regular” (Interview 6, line 113) participant, although he stated that he uses the hashtag often outside the weekly chat time. Russell was able to share a lot of information through the interview and answer the questions I asked about the #Edchat group, though he said that he does not participate on a regular basis. Overall, he noted that he moves between occasional participant to lurker, outside the #Edchat group.

In the interview with Connor, a newcomer to #Edchat, he stated that he “started off as a lurker but now [he tries] to jump in and be part of the conversations as much as [he] can” (Interview 1, lines 46-47). Through his observations, he has been able to understand how the group works and how the weekly chats are set up, which led to him joining in the conversation. Both Connor and Russell feel like they are a part of the #Edchat group, though Russell does not participate very often and Connor is new to the experience. As participants, one who is new to the community and one who has been a part of the community for years, both engage in lurking as a way to enter and then return to the group’s weekly chat conversations.

Indicators not present. One indicator that was not present in the data was that of knowing what others know, what they can do, and how they can contribute to an enterprise. With the wide range of participants in the weekly #Edchat, it is hard to know the level to which a person truly knows information about the topic at hand. Within the setup of Twitter, each person can share a short biography of information about himself/herself, but there is no way to prove

that what he/she says is true. People must be taken at their word and that which is shown through their tweets and the information they share.

A second indicator not present is that of a shared discourse reflecting certain perspectives on the world. Throughout the weekly #Edchat, participants come from many different positions within the field of education. They also come from many different parts of the country, due to the openness of the Twitter medium. Each member reflects a different perspective on the field of education and brings his/her perspective to the weekly chats. This allows for the engagement of many different opinions each week through the discussion of the weekly chat topic. Scott, an assistant principal, stated, "[I] participate in conversations where I think I can be useful or helpful or push back on somebody" (Interview 7, lines 52-53). Through the interactions on Twitter, we do not find a shared discourse that reflects certain perspectives on the world, as the participants bring many different viewpoints to the chat each week.

Expanding communities of practice theory. Through the analysis process, themes that emerged within the data were viewed through the lens of communities of practice theory. Those that did not fit within one of the indicators work toward expanding the theory, especially for communities of practice that exist in online spaces. The additional indicators that were present, thus expanding the communities of practice theory, are (1) connection and conversation and (2) planning and preparation.

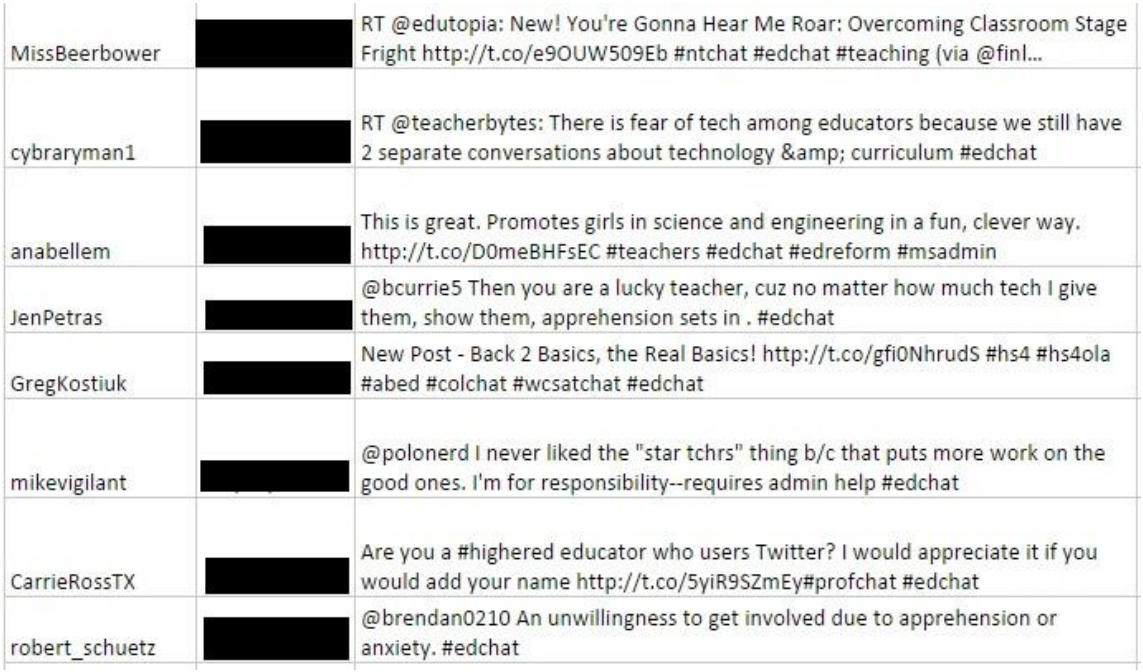
Connection and conversation. The themes of connection and conversation were present throughout the data. While these themes were discussed initially under the indicator of "collaboration" within best practices of professional development, they are slightly different and

may bridge the areas of professional development and community of practice as illustrated by #Edchat.

For example, the topic one week was "becoming a connected educator." One participant tweeted, "There are many places to be connected - here, @edmodo , nings, - it's about making the decisions to connect #edchat" (Observation 1, line 45), while another shared, "Twitter has allowed for real time learning vs waiting for conferences. Where I meet my twitter peeps in analog #edchat" (Observation 1, line 811). Eddie stated that "Going to conferences is amazing now. It's a whole new dimension. I used to go to conferences in the 70s and 80s and I hardly knew anyone. Now you have people you know . . . it was just wonderful meeting the people who, you know, you connect with on Twitter" (Interview 2, lines 167-172). #Edchat participants interact on a regular basis and, over time, develop a network of people they can contact for resources and to provide support. Through conferences and other opportunities to meet in person, they are able to take their online conversations into the realm of face-to-face interactions and continue to build relationships with one another.

The concept of conversation is very prevalent within the #Edchat data. Through #Edchat, participants engage in conversation each week, discussing the weekly chat topic on Tuesday nights, as well as engaging in outside conversations during the week. The conversations are identified by tweets back and forth that include tagging the person they are talking to in the tweet, assisting in linking the conversation thread. Figure 4 provides a visual snapshot of the tweets in the weekly chat. The RT indicates a retweet. The inclusion of the @ symbol with a participant's name within a tweet indicates that information is directed at them. Through the conversations, relationships are established with fellow participants they can go to with questions

and to gather resources. They share their successes and their failures and assist one another along the way, helping to establish a personalized learning network.



MissBeerbower	[redacted]	RT @edutopia: New! You're Gonna Hear Me Roar: Overcoming Classroom Stage Fright http://t.co/e9OUW509Eb #ntchat #edchat #teaching (via @finl...
cybraryman1	[redacted]	RT @teacherbytes: There is fear of tech among educators because we still have 2 separate conversations about technology & curriculum #edchat
anabellem	[redacted]	This is great. Promotes girls in science and engineering in a fun, clever way. http://t.co/D0meBHFsEC #teachers #edchat #edreform #msadmin
JenPetras	[redacted]	@bcurrie5 Then you are a lucky teacher, cuz no matter how much tech I give them, show them, apprehension sets in . #edchat
GregKostiuk	[redacted]	New Post - Back 2 Basics, the Real Basics! http://t.co/gfi0NhrudS #hs4 #hs4ola #abed #colchat #wcsatchat #edchat
mikevigilant	[redacted]	@polonerd I never liked the "star tchrs" thing b/c that puts more work on the good ones. I'm for responsibility--requires admin help #edchat
CarrieRossTX	[redacted]	Are you a #highered educator who users Twitter? I would appreciate it if you would add your name http://t.co/5yiR9SZmEy#profchat #edchat
robert_schuetz	[redacted]	@brendan0210 An unwillingness to get involved due to apprehension or anxiety. #edchat

Figure 4. Screenshot of a transcript from the #Edchat weekly chat

The conversations in the #Edchat group are similar to those that educators engage in every day, both face-to-face and through technology, in that they only cover the surface when connecting and sharing information. With only 140 characters allowed, it is hard to discuss topics in-depth. But through the conversations, those who participate in #Edchat are establishing a connection with one another and forming relationships within a space where they can contact

others for help when advice is needed. These relationships open the door for more in-depth conversations to happen, often within other mediums, such as blogs posts and by email.

Stewart, one of the founders of #Edchat, shared that #Edchat was established through the spirit of connectedness. He noted

> that's the power of connectedness, that's what [the founders] were able to do as connected educators, we're able to, um, collaborate on an idea and put the idea together and actually act upon that idea and have it come to fruition right there on the internet it's great. (Interview 8, lines 124–126)

#Edchat was founded through connection and continues to cultivate that connection through the weekly conversations.

Connection goes beyond the surface conversation. Through #Edchat, the people who are brought together have a shared interest in education, discussion, and sharing information on hot topics. They talk about hot button topics in the field of education and often find they are likeminded. Rachel shared, "we don't have these conversations that are not full of different issues, we talk about really tough things, the achievement gap, lack of technology, um, genius hour, project based, I mean we talk about it all, flipped classroom, I mean everything" (Interview 5, lines 282–284), focusing on the idea that no topic is off limits within the community, and participants are open to approaching topics that might be considered controversial.

Another participant, Russell, spoke of the speed of the #Edchat conversations and how it is easier when "you kind of get involved in I think in smaller discussions in the sense, like with the people that are retweeting what you're tweeting, the people that are replying to you so there do become these little kind of a little more manageable discussions" (Interview 6, lines 134–137)

within the overall #Edchat conversation. “I think it's just a phenomenal way to connect with passionate educators and people who are interested in education” (Interview 2, lines 5-7), stated Eddie, a moderator with #Edchat, while also sharing “yes we're connecting not only, um, with, um, educational ideas and pursuits but we're connecting, we're support, there's a great caring sharing network” (Interview 2, lines 180–181). In addition, he stated, “how else would you get to connect, learn, share?” (Interview 2, line 228).

Though this connection on Twitter and the conversations within the weekly #Edchat, teachers are forming community. They are putting together a network of individuals they can then go to with questions and to seek advice. These topics of conversation and connection support the community of practice that has developed within the #Edchat group and that have connected to the best practices within the field of professional development.

Planning and Preparation. Through my own detailed observation, I was surprised by the amount of planning and preparation that is present in each weekly chat. This was further supported through my interviews, specifically with the moderators, as I discovered that a great deal of organization goes into what participants experience each Tuesday night. There is a great deal of planning and preparation involved that is not visible to the casual participant.

During my observations, I was able to view the process, the planning and preparation, for the weekly chat in progress. Every week the moderators tweeted just before 7:00 p.m., “Welcome! Thank you for joining us. Please remember on each tweet to use the hashtag #Edchat” (Observation 1, line 1). Then, throughout the chat the moderators posted, retweeting what others said and pulling the focus back to the topic, if it should waiver. At the end of each chat, there was a thank you tweet: “Thank you to all who participated in #edchat tonight.

Archives of topics can be found at http://t.co/ycydYVtTiS" (Observation 1, line 1399), then one last tweet, stating, "Thanks for "connecting" with us on #edchat Please "reflect" on this conversation help Be the Change that is needed" (Observation 4, line 1356).

This weekly interaction assists in establishing a routine and forming consistency within the group. Twitter can be a medium that is hard to follow and, especially when joining in on a fast conversation during a weekly chat, participants can feel overwhelmed. Through the wiki page providing tips and the moderators assisting each week with moving the chat forward and assisting new participants, those who join in note the support. One person tweeted during the #Edchat, "I'm learning about edchat for the first time" (Observation 5) and one of the moderators replied, "Jump right in with your thoughts" (Observation 5), providing support and acknowledging him/her as a first time participant.

Through my observation, I noticed that the moderators join in exchanges with the participants, encouraging the conversation and sharing his/her thoughts and wisdom. During one weekly chat around the idea of connected educators, one of the moderators tweeted, "Many educators are afraid of the unknown so their colleagues and even students can help them get connected #edchat" (Observation 1, line 717), while at almost the exact same time, another participant stated, "Teachers now may also feel they do not have enough time/effort to use technology to stay connected #edchat" (Observation 1, line 736). The moderator's statement was retweeted five times in the next 2 minutes of the conversation, along with three replies, pushing the conversation into discussing the need for assistance and the fear of the unknown regarding being a connected educator, as well as propelling the chat forward. Three replies also came in during those 2 minutes to these two statements, including the following: "I had just as much

trouble getting younger teachers involved – no instruction in tech at university" (Observation 1, line 773) and, "So true. My students have taught me so much this year. They see things VERY differently" (Observation 1, line 782). The third response pushed back on the original statements, saying, "As a seasoned T, I'm not so sure that I agree w/ that!!!" (Observation 1, line 774).

In my conversations with Eddie, one of the weekly moderators, I asked him to share with me what a typical Tuesday night would entail for him as he participates and moderates #Edchat. He started by saying, "I think you have to understand the whole process. Sunday the five topics are put up out for polling. People have from Sunday, around noon time Sunday, until, uh, 10:30 in the morning on Tuesday. And that's when I find out what the topics are for that day" (Interview 2, line 81-83). Preparation for the Tuesday evening chats begins days before with participants voting on the weekly chat. The topic that receives the most votes is the topic for the 7:00 p.m. (EST) discussion, and the topic with the second most votes is the topic for the noon (EST) session. Next, Eddie shared that he likes to take time before the chat to get ready for the weekly discussion. He stated, "I like to prepare. Not only do I tweet out the topic that's going to be presented but I do try to come up with, um, interesting questions and some information . . . that will help, uh, with that topic" (Interview 2, lines 84-86).

Then, when it is time for the chat to begin, Rachel, also a moderator, shared, "it's us moderators who are giving advice, you're new, don't forget to add the hashtag at the end, um, we try to say if you need any help, let us know, tell us hi, we tweet the moderators" (Interview 5, lines 174-176). This practice is to help participants, whether they be returning members of the community or newcomers to the group. The advice is provided to assist those who are new and to remind those who participate each week.

The presence of an organized structure within the weekly chat establishes that participants can expect an efficient experience each week. It is not a haphazard gathering on a social media site at an appointed time, but an organized event with a good deal of thought put into the topics; though participants may not realize just how much effort has gone into planning the weekly chat. Participants who volunteer to be weekly moderators take on an important role, assisting in focusing the conversation and supporting participants, particularly those new to the #Edchat. This structure and support is an attempt to make each weekly chat a good experience for those involved and to support their professional growth. The planning and preparation for the weekly chat support the aspect of planning needed in professional development and the thought that goes into growing a community.

Summary

The #Edchat displays many of the best practices identified from research on professional development. Teachers are learning from and participating in conversations that focus on the participants and their needs over an extended period of time. The emphasis is on the content and provides the opportunity for communication and conversation, and while these may support collaboration, collaboration itself is not visible in the tweets. Despite the fact that teachers are not provided opportunities to actively participate in the professional development, they do assist in making decisions on topics by sending in suggestions to the founders and weekly moderators and participating in the weekly poll.

As this group takes part in the weekly chats and engages in informal professional development, over time, they have developed community. They come together over shared interests and spend time exchanging information with one another and building relationships.

Through growing the conversation around education, they are engaging in the practice of the community and exploring the field of education with seasoned participants and newcomers alike. Two indicators were not present within the weekly chat, including (1) knowing what others know, what they can do, and how they can contribute to an enterprise and (2) a shared discourse reflecting certain perspectives on the world. Through the medium of Twitter, it is not possible to truly know what other members know and what they can bring to the #Edchat, especially if they feel restricted by the medium itself. In addition, the #Edchat provides an open space for discussion and brings together many different people from across the country. Their perspectives on the world do not provide a shared discourse and viewpoint on the world. The presence of that indicator could be a negative for a community such as the #Edchat that works to engage people from all areas in the field of education.

New indicators that are being met through the #Edchat group are (1) connection, (2) conversation, and (3) planning and preparation. Building blocks of collaboration include the concepts of connection and conversation. Through the #Edchat group, members are able to connect with one another and build relationships. This is further developed through the conversations they engage in each week around the weekly topic. Last, a foundation has been created through the planning and preparation that goes into the weekly chat. Each week, members of the community assist in preparing for the weekly chat by selecting topics, sending out a poll, researching the topics, and supporting the chat from the first tweet of the topic to the last tweet reminder to “be the change that is needed in your class/school” (Observation 3, line 1047).

As a whole, the weekly #Edchat is described best through its organization and the different levels of participation, bringing together many views on the field of education. It is held together by the moderators and founders who shared a vision for a place of discussion and engagement within the social network Twitter. Through their continual support, the #Edchat happens each week, a constant for those who are looking to engage with others as they grow and learn as educators.

Chapter 5

Discussion, Conclusions, Implications, and Future Research

Through a case study of the #Edchat group, I have investigated informal professional development through the lens of best practices in the field of education and communities of practice theory. Within this chapter, I will summarize my findings, which are outlined in detail within Chapter 4 and discuss those findings in light of the theoretical framework and previous literature in the field of professional development. I will also provide suggestions for future research and expansion of the best practices for professional development and potential applications of communities of practice theory to the research of online professional development spaces.

Through my review of the literature around best practices in professional development, I identified five characteristics as having the most impact on teachers and their teaching practices, including (1) focus on participants, (2) extended duration, (3) emphasis on content, (4) opportunities for collaboration, and (5) active learning. These characteristics guided my analysis of the data, during which I found that #Edchat included a focus on the participants, extended duration of professional development interactions, and an emphasis on content. Opportunities for teacher collaboration, though not fully present, may be supported through the connections and conversations that occur in #Edchat. Finally, the data from the #Edchat group did not provide evidence for supporting active learning by those involved.

Next, I explored #Edchat as a medium for professional development. The findings showed that #Edchat participants felt that it was a form of professional development. Those who

were interviewed spoke positively of the #Edchat group and noted it as one aspect of their professional learning.

Lastly, I explored the data through the lens of the communities of practice theory developed by Lave and Wenger (1991, 1998). Communities of practice theory proposes that three aspects must be present for a community of practice: domain, community, and practice. The findings support the presence of a common domain, community, and practice in #Edchat, as well as (1) sustained mutual relationships, (2) rapid flow of information and propagation of innovation, (3) absence of introductory preambles, (4) very quick setup of problem to be discussed, and (5) substantial overlap in participants' descriptions of who belongs. Indicators not present were (1) knowing what others know what they can do and how they can contribute to an enterprise and (2) a shared discourse reflecting certain perspectives on the world.

Within this chapter, I discuss how the findings from the #Edchat group support the research on best practices in professional development. I next share instances of where the #Edchat group is not meeting the best practices and how these findings can support those who create instances of online professional development for teachers. I also discuss Twitter as a medium for online professional development and how this environment supports teacher interactions. Next, I consider the ways in which the #Edchat group meets the characteristics of a community of practice. Finally, I discuss suggestions for future research and final thoughts.

Discussion

Professional Development

Professional development can be defined as encompassing all of the formal and informal training that a teacher experiences from his/her days as a pre-service teacher through retirement from the field of education and beyond. My interaction with participants in the #Edchat group has provided me with a richer understanding of professional development. In reviewing the research on teacher professional development, I found that much of the focus centered on more traditional professional development. Research is now moving toward applying characteristics and outcomes from traditional professional development to more informal methods, specifically those in online spaces.

The #Edchat group provided the opportunity to focus on the aspect of informal learning. Informal learning can be defined as learning opportunities that have no curriculum, nor are they constrained to a specific medium (Desimone, 2009; Richert et al., 2011). Findings from previous research state that there are many influences on whether or not a teacher will participate in informal learning (Hoekstra et al., 2009). Teachers who are engaged in their work and feel supported are more likely to seek out instances of informal learning. A balanced learning program, providing both informal and formal professional development in both face-to-face and online spaces, allows teachers to explore the different mediums and determine the type of activities that best support their learning.

Best practices

Focus on the participants. Previous research has shown that a focus on participants is an important aspect of effective processional development. Nir and Bogler (2008) noted that being

involved in developing the structure and content of professional development sessions leads to teacher satisfaction. Through the observations and interviews, the founders and moderators of #Edchat focused on the participants and their needs in many ways. First was through the opportunity to choose the topics for the weekly chats. Though Stewart, one of the founders, crafts the options for the weekly chat discussions, the hashtag followers can vote on the topic for the week. As Stewart develops the weekly topics, he selects from the current trends and most popular issues in the field of education at the time. Overall, the core group of the #Edchat group—the moderators and founders—continually put the needs of the participants in the forefront by listening and allowing for input in all aspects of the weekly chat.

Yamagata-Lynch (2003) noted that professional development should not only meet teachers' skill needs, but also look at outside influences, such as "social, cultural, political and administrative aspects of school systems" (p. 605). Emphasis should be placed on not neglecting the human aspect when developing and presenting professional development. The founders of #Edchat focused on the needs of their participants when creating a second chat. By listening to the participants, they were able to find a time that was a better fit for those who wanted to participate from other countries, especially in Europe. Through their understanding of the social and cultural aspects of the participants and their environments, the #Edchat core group was able to best support the participants.

The #Edchat group places a high emphasis on the needs of its participants. In the realm of more traditional professional development, emphasis is often on the needs of the institution (i.e., the school or school system) and the need for change (Fullan & Stiegelbauer, 1991). An emphasis on the participants and their needs is what draws people to #Edchat. They are able to

encourage change, but the teachers' interests are placed first. As leaders and administrators plan professional development opportunities, they should be encouraged to seek out their audience, the teachers who will participate in the professional development, to gain their views and insights. By planning professional development that supports teachers' needs, they will move toward instituting change and encouraging growth in the field of education.

Extended duration. The importance of extended duration of professional development has been found repeatedly in the research on professional development (Darling-Hammond & McLoughlin, 1995; Desimone et al., 2002; Garet et al., 2001; Hunzicker, 2011). The #Edchat group has met weekly for more than 4 years, providing consistency for its participants. The weekly chat offers the opportunity for intense engagement once a week, and the ability to use the hashtag throughout the week provides for continued and ongoing discussions. Stewart spoke to the consistency of the group being one of the features that has made it so successful. This is consistent with calls in the literature for professional development to move away from one-shot sessions due to their lack of accomplishment. The #Edchat group supports the need for professional development to occur over time.

The two features of extended duration are (1) the span of time the professional development activity covers and (2) the period of time the teacher has to engage in the activity (Garet et al., 2001). Over time, studies of professional development have called for a move away from one-shot, short-term sessions (Kennedy, 1998) and expansion in the amount of time a teacher interacts with the material (Garet et al., 2001). Through the interviews, participants expressed different lengths of participation with the #Edchat group. Some take part each week, and some are more sporadic. Those who are members of the core group of founders and

moderators reported engaging every week, while others, like Russell, shared that, although he does not participate on a regular basis, he knows the weekly chat is there when he needs it.

During the 5 weeks that I observed, although a large number of participants tweeted at least once (2,354), only a small number participated in two or more chats (~300). The accountability aspect is missing from the #Edchat group, as there is no expectation of participation. While the #Edchat group is there and available, the majority of those who participate do so not as a part of the chat conversation, nor with any consistency. Whereas the overall aspect of extended duration is available, those who take advantage of this opportunity in #Edchat are just a small part of the overall #Edchat population.

The consistency of the #Edchat group speaks to its success and is something that those who develop professional development opportunities can incorporate into their sessions. Teachers need more time—more time with the information or concepts that are presented and a longer time span to sit with the information that is shared. As administrators and educational leaders provide professional development to teachers, hopefully they will begin to plan for more time. This will allow teachers to delve deeper into the concepts and materials and the opportunity to put into practice what they have learned.

Emphasis on content. Kennedy's (1998) research began a shift away from viewing professional development sessions in terms of their structure, toward focusing on the content shared through the professional development sessions. The #Edchat group's content focus is on the field of education, made visible through the weekly chat topics. They often engage in topics around technology and education, but the overall focus is on the field of education itself.

Previous research on professional development has focused on the (1) subject matter, such as math, science, social studies, and (2) knowledge about how students learn (Garet et al., 2001). The #Edchat does not focus on one specific content area; its focus is broader in scope, encompassing the entirety of the education field. Participants come from all subject areas and levels of education (i.e., elementary, middle, high, or higher education). Through the weekly topics, teachers engage with one another on subjects that matter to them. The Twitter environment allows teachers the opportunity to take part when they can for an extended amount of time on a variety of matters that excite and encourage them in their work.

#Edchat has found a way to focus on the field of education and reach those who come from many different backgrounds. By keeping the scope broad, they are able to support the participants in the overall topics in education. But, they cannot discuss specific subject matter. Additional chats are available through Twitter that focus on content-specific areas. #Edchat can be seen as a gateway to other chats, allowing for a broad education conversation within the community and, further, opportunities for specific conversations around subject areas outside the chat.

In developing professional development sessions, leaders should consider their audience and scope of their audience's work as they prepare the content for their sessions. For professional development activities that invite people from many different areas, a broader focus should be taken to allow for all to be involved. This will provide a rich conversation and allow engagement from across the span of education for those who teach diverse subjects to connect through their practice. For professional development sessions that invite teachers from a specific subject or

grade area, they can take the opportunity to shift the focus to the subject matter content itself, to assist in providing teachers with varied opportunities for learning.

Collaboration. Guskey (2003b) cited collaboration as one of the most consistently prevalent topics within his review of the literature on effective professional development. The encouragement for teachers to engage in collaboration during professional development is growing (Desimone 2009; Flint et al., 2011; Garet et al., 2001; Meirink et al., 2007). But instances of collaboration among the participants were not visible in the #Edchat group. Though the Twitter environment supports conversations around collaboration, collaboration itself was not present within the weekly chat activities.

Collaboration within professional development is defined as the opportunity for teachers to work with one another, sharing knowledge and exchanging ideas. Collaborating during professional development might assist teachers in finding meaning from the information that is shared during the sessions (Flint et al., 2011). Though collaboration itself was not present within the #Edchat group, teachers engaging in conversation, connecting with others, and sharing resources was clearly evident. These could be considered building blocks of collaboration that assist the teachers in forming relationships with one another, but full engagement in collaboration may not occur in this medium.

Researchers (Gusky, 2003b) have noted that collaboration should move the participants forward rather than perpetuate conflict. The presence of the moderators within the #Edchat provided this forward movement. Their continual engagement in the many conversations assisted in moving the conversation forward and not allowing it to stall. Through the specific conversation of @CaliTeach, I demonstrated the movement of conversation and the ability for

participants to connect with others. Together, teachers who participate in the #Edchat group are sharing, connecting, and, perhaps, developing community with one another.

The opportunity for teachers to engage, connect, and share resources has grown in importance. The realization that teaching is a very isolated activity has prompted the need for opportunities where teachers can engage with one another. Professional development provides this opportunity in both formal and informal spaces. The #Edchat group highlights that although teachers are provided with an environment in which to converse and connect, engagement and full collaboration to assist in transforming teaching are still needed.

As a teacher chooses to participate in the #Edchat group, his/her opportunities for conversation and connection increase, along with the added accessibility to resources that support their work. From the #Edchat group, we see instances where teachers are engaging with one another in a space that focuses on their needs over a period of time and provides opportunities to connect and converse. This supports the experience that teachers are able to have within the learning space. As leaders in the field of education continue to push for professional development for teachers, they will need to work on the opportunities for teachers to engage in collaboration.

Active Learning. Active learning is a key component of professional development. Garet et al. (2001) highlighted the four dimensions of active learning, which include observing and being observed teaching, planning for classroom implementation, reviewing student work, and presenting reading and writing. Through the Twitter medium, teachers do not engage face-to-face, and, therefore, are unable to observe one another teaching. They also do not have the ability to present their reading and writing within the Twitter environment, as there is a 140-character

limit. It is possible that some teachers plan for classroom implementation during the #Edchat group, but this is only speculation. They do share information and discuss ideas during the chat that can lead to changes within their classrooms. In general, the #Edchat group does not meet the best practice of active learning.

Webster-Wright (2009) discussed a shift from passive to a more active form of learning and how it requires a new way of thinking about learning. Within the #Edchat group, the learning consists mostly of acquiring information, and participants cannot be fully a part of the process. Teachers may return to their classrooms and put into practice what they have learned through the #Edchat discussion, but there is no way to confirm that possibility from the data that were collected for this study. This need of professional development is one that the #Edchat group cannot fulfill.

In considering the two aspects that contribute to active learning, according to Garet et al. (2001) and Desimone et al. (2002), the #Edchat group allows participants to engage in discussion. However, it does not allow teachers to engage in shared practices within the professional development experience. These attributes lead to the overall complexity of professional development within online spaces and in meeting the needs of the teachers involved. The constraints of online discussions and experiences do not fit into the dimensions that were identified through analysis of more traditional, face-to-face professional development experiences. The online environment allows for the #Edchat group to fit within one aspect of active learning and yet not fit into others.

What does this mean? For those who support professional development in online spaces, the ability to support active learning is not present. Previous research (Desimone et al, 2002;

Garet et al., 2001) has shown importance of this aspect, yet #Edchat is unable to meet it as a form of informal learning in an online space. Those who develop online professional development opportunities must take this into consideration and look for ways to engage teachers in different ways to continue to support their growth and learning.

Summary. The field of research on teacher professional development is continually developing and changing. Over the last few decades, the focus has moved to identifying best practices that, when present, will ensure that the professional development is "effective" in changing teachers' teaching practices and improving student achievement. Over the course of this study, the #Edchat group exhibited some of the best practices within the field of professional development, but not all. Those in the field of professional development are still in pursuit of the format and content that will provide teachers with the best experiences that support their work in the classroom.

For practitioners who have the opportunity to create professional development for teachers, whether it be online or in face-to-face situations, the inclusion of these best practices will assist in forming sessions that support teachers in their growth and help them in their pursuit of effective teaching, however that may be defined. But due to the constraints of the medium used, the ability to provide instances of collaboration and active learning may not be possible. Those who facilitate online professional development will need to begin to look for ways that teachers can engage in collaboration and active learning through other means.

Teachers can be resistant to change, especially that which pushes back against the view they have of their current teaching. In addition, it is hard for teachers to approach professional development with open arms, especially if they have experienced professional development that

does not deliver results (Darling-Hammond & McLaughlin, 1995). Within professional development, a greater focus on teacher satisfaction and growth can prepare better those times of change that are inevitable.

It may be time to view professional development through a broader lens and redefine what we consider to be successful professional development. Looking at teacher satisfaction within professional development and satisfaction with their work through a focus on their needs may be one approach. A more comprehensive approach for viewing professional development is one that includes the ideas of an increase in teacher happiness with his/her work, results in teacher growth, and increases school stability. Together they may be items to consider as indicators of success with professional development.

Twitter as a Medium for Online Professional Development.

Through this case study, an emphasis was placed on the medium itself—Twitter. This medium of an open social network and microblogging site provides an online location for teacher professional development. As a form of online professional development, the #Edchat group is using an open social network as a way to reach many people from all parts of the country and across the world. The openness and accessibility from many devices allows for teachers to choose when they engage with others in the online space. Dede et al. (2009) spoke to the opportunities that online teacher professional development provides: a way for teachers to engage in professional development that fits their busy schedules and draws upon activities that support them as teachers. Twitter allows teachers to participate within their own schedule, as it fits into their daily lives and work demands.

The #Edchat group is also able to engage a large number of participants due to the Twitter medium. Keown (2009) found the reasonable size for an online community to be 10-20 diverse participants, and #Edchat challenges this statement. The Twitter medium is redefining what an online community means, as the #Edchat group engages many more than Keown (2009) found to be a "reasonable size" (p. 301) for a successful community. Although only 17 people participated in all five weekly chats, which falls into the range Keown notes, 30 people participated in four chats and 52 participated in three.

Throughout the span of my observations within the #Edchat group, the number of participants in the weekly discussion varied greatly. Though not all recorded participants engaged in the work of #Edchat on a regular basis, over 2,000 tweeted with the hashtag during the observations. There is no limit to the number who can participate and no permission is needed. The Twitter medium is allowing for more and more people to join in the conversation and expand opportunities previously only available to a few through more traditional mediums. But, this medium is restrictive due to the limit on the number of characters in a post. Twitter is able to reach broadly, but not go very deep.

Schools may want to encourage participation in informal professional development in online spaces. Participants in the Twitter chat shared that they get much more from their interactions on Twitter than they do from more traditional professional development. Liberman and Mace (2010), too, noted that teachers are sharing and connecting more and more in online spaces and speculated that soon teachers would use the spaces to assist them in their own professional learning, which is the focus of this study. Alternative methods of professional

development, such as #Edchat and other educational online communities, allow teachers to individualize their own personal growth and development.

The term PLN can refer both to a personal learning network and a professional learning network. The research on personal learning networks is not very extensive (Visser et al., 2014), but "has addressed how PLNs are used within social media sites" (p. 397). A PLN can be defined as a "collection of resources that is accessible when you want to learning something and can include both people . . . books, journals and a variety of multimedia Web resources" (Bauer, 2010), though within the #Edchat group, the term refers to people. The topic of developing a PLN is visible within the #Edchat group and supports the idea of connecting with others as a source of support for the practice of teaching.

#Edchat could serve as s a gateway for educators to other chats available on Twitter. At the time of this writing, more than 300 weekly chats were available for teachers (Blumengarten, n.d.) , ranging from topics on specific areas of teaching (such as elementary, middle, and high), topics focused on specific subject areas, such as Geometry or History, as well as topics by geographic location, including chats for educators from Tennessee, Illinois, and Florida. These groups meet on weekly, bi-weekly, and monthly rotations and engage teachers from across the world. Many teachers engage on #Edchat and then move on to engage with teachers in their specific areas of interest or need, such as teaching within their grade level, subject area, or physical location.

However, the limitations of these types of professional development are the same as those for the #Edchat group. Though they can place a higher focus on the content they cover, as their range is not as broad, they are still not able to provide instances of full collaboration and active

learning. In addition, the #Edchat group supports the teachers who participate, those who might not be supported through more traditional professional development offerings. But Twitter is not the medium for everyone. As a social network, the Twitter environment attracts those who wish to engage with others and those who have a level of technical knowledge to use the tools as they participate in the #Edchat weekly chat. Together these characteristics establish that this medium may not be best for everyone in the field of education and therefore not able to support everyone in becoming a part of informal professional development in online spaces.

Thought it meets many of the best practices found to instill change in teachers, professional development in online spaces, especially Twitter, is not the answer to the question of how we can reform the educational system through professional development. More research is needed to better understand how online professional development can support teachers and, as stated by Vrasidas and Zembylas (2004), "more research is required to understand the variety of possibilities opened by online professional development" (p. 332). The #Edchat group has found a way to harness the power of online connection to support teachers, and it's not going away anytime soon. The people of #Edchat have found a way to harness this online connection to support teachers and their interests.

#Edchat as a Community of Practice**.**

Communities of practice theory is one that is often used as a framework for exploring both informal learning and professional development (Hartnell-Young, 2006; Warren & Little, 2002). Researchers state that the development of the community is the most important aspect in supporting teacher development (Buysse et al., 2003), and within the field of education, research has shown that community development assists teachers in both learning and improving their

instruction (Borko, 2004; Ingvarson et al., 2005). The #Edchat group is an instance of informal learning in an online space that works to support teachers. The findings of this study show that many of the indicators of a community of practice are evident within the group, encouraging the development of connection between members and the expansion of online opportunities for teachers in the field of education.

Domain, Community, and the Practice of #Edchat. Participants shared in the creation of the domain by engaging others in the choice of topics for the weekly chat, the shared interests that bring together the members of a community. The weekly topics have shifted over time, exploring the ever-changing ideas that are part of the conversation around education. This shared interest, or domain, is what connects the participants and brings together the members of the community. By sharing information, participating in the weekly chat and in the growing of relationships, participants have been able to engage with others and grow a sense of community. Through their weekly interactions, participants share information and assist one another as they build relationships.

This practice is evident through the consistency of the weekly chat. Participants engage in the development of a shared repertoire and join in the conversation weekly as a part of the community. They have developed a shared repertoire as they vote for the weekly chat topic and share tools to assist those in participating. They help one another and support them in their work. Participants in the weekly chat are developing community as they encourage one another within the practice around the domain of education.

This development of the domain, the community, and the practice comes together to support the work of the educators on #Edchat. Administrators and leaders in the field of

education can use the example of #Edchat to establish future communities. They can continue to support those who are looking for opportunities to develop as educators and to develop support as professionals in the field of education.

Indicators of a Community of Practice. Through the development of the communities of practice theory, Wenger (1998) established indicators that, when present, show that the group has reached mutual engagement, negotiated enterprise, and created a repertoire of resources. These three dimensions are an essential part of a community of practice. #Edchat demonstrated the community of practice indicators of sustained mutual relationships, rapid flow of information, absence of introductory preambles, quick setup of a problem, and substantial overlap in participants' descriptions of who belongs. Each of these indicators weave together to establish the work of the #Edchat community.

The indicator of sustained mutual relationship was shown through the continued participation of the founders and moderators who help make the #Edchat successful each week. This core group of #Edchat continued to support the work, even as some participants drifted in and out. They met and worked together each Tuesday night and participated in the chat along with all the other participants. In the development of communities, the relationships among the members is a crucial aspect in establishing mutual engagement. People in the field of education who wish to establish communities to support teacher growth must encourage the development of relationship. This is an aspect that must not be overlooked, as it is crucial to sustaining the community.

The relationships developed through the #Edchat group directed many of those interviewed to provide me information on participants who belong to the community. All of the

participants I interviewed shared with me the importance of the founders and moderators and encouraged me to reach out to them for further information. The development of communities of practice, especially in the field of education, relies on the relationships that are developed. As people continue to create and identify communities of practice, they will do well to encourage sustained relationships, especially with those in leadership roles. As those who develop communities continue to participate in the work, they can then support the identification of those who belong and those who do not.

The rapid flow of information was visible through the weekly chat. Many participants spoke to the speed of information that was shared and the pace of the conversations. The restriction to only 140 characters per post within the Twitter medium also perpetuated this quick forward movement of the conversations. The rapid flow of tweets provided participants with many links to resources and posts that support topics in the field of education. In addition, the group was able to quickly set up the problems that take the form of the weekly chat topics. These weekly chat topics were developed and sent out on Sunday of each week for voting on by participants. By Tuesday the topics were chosen and the conversations were ready to occur. This allowed for the weekly chats to focus on the most relevant topics in the field of education and supported teachers with in-time learning regarding the most relevant issues in education.

The rapid flow of information and quick setup of the problem assisted in dissolving the need for introductory preambles. The weekly conversation seemed to never really end, as the medium supported the continued conversation and connection throughout the week. One of the founders shared that #Edchat has become the hashtag for educational tweets, thus linking many

people to the work of #Edchat and its participants. The conversation was an ongoing process and those who joined in could quickly become a part of the conversation.

Classroom teachers typically enjoy the quick movement of information. They often need resources and information in a short amount of time so they can move on to support their students in the learning process. By providing information on a continual basis and supporting teachers with very relevant topics and discussions, the #Edchat group was able to sustain the work of teachers. As those who develop online communities look at the structure of their groups and how they will share information, they could look toward the success of the #Edchat group as an example. They must work to continually engage teachers by providing up-to-date information relatively quickly, so as to not lose their participation.

The #Edchat community that has emerged is one that exhibits many of the indicators of a community of practice, but not all. This finding supports the research of MacPhail et al. (2014) and their discovery that communities of practice exist at varying degrees and at varying levels, depending on their stage of development. Together, the findings of some but not all aspects support the work of Johnson (2001) who stated that online communities have a life cycle. While it has yet to be seen where the #Edchat group is within their life cycle, they continue to have a presence within the world of education and Twitter.

Levels of participation. Wenger et al. (2002) established levels of participation in *Cultivating communities of practice: A guide to managing knowledge* and expanded these roles through a post on their website. Those who participate in a community of practice do so at different levels of engagement. Together the different levels contribute to the whole of the community.

The different levels of participation included the core group, active participants, occasional participants, peripheral participants, and transactional participants (Wenger, 2011a). During the interviews with participants, each shared his/her current level of participation. Those who were identified as founders and weekly moderators made up the core group of the community. The remaining interviewees, except one, fall into the active participant, occasional participant, and peripheral participant groups. Many participate on a pretty regular basis in the weekly #Edchat. The one exception was Russell, who identified himself as not a regular participant, but one who does visit the group occasionally, and happened to participate one night I observed. His participation could be considered as a peripheral participant or one that sometimes moves into the role of lurker within the #Edchat community.

Online communities, especially those in an open medium such as Twitter, need to include lurkers as they consider the different levels of participation. Though this group is a hard group to identify within online interactions, they make up a large portion of the community as a whole (Wenger et al., 2002). For those who conduct research in these communities, it is hard to understand the needs of those who choose to view the conversations but not to participate.

Identifying how many participants returned over the course of the five observations revealed that only a small, core group are continually present each week, even though the community feels like a large group. Although more than 2,000 people tweet during the weekly chat hour, those who speak to the topic of #Edchat and engage in the topic is a small number. This this can make engaging in the conversation more difficult, as participants must sift through the chatter, but continued participation makes the process easier. It also allows for the growing understanding of those who are there to participate in the conversation and those who are not.

Participants in a community of practice are likely to do so at different levels of interest (Wenger et al., 2002). The understanding of how people move between the levels of a community will assist those who are in leadership roles in communities of practice. It will also assist those who are a part of a community of practice to understand one another. Everyone within an organization will not always participate at the same level and will often move between levels as outside factors play into his/her participation. Support must be placed at all levels of participation to encourage everyone who is a part of the overall community.

Summary. Johnson (2001) established a distinction between a virtual community and a community of practice through his review of professional development research. The #Edchat group is an unplanned virtual community within an online social environment that has developed into a type of community of practice. Through their engagement in domain, community, and practice, the participants of the #Edchat group are engaging in connection, conversation, and the sharing of information. Together they are a virtual community that exists as a form of professional development. By viewing their success, researchers and practitioners can learn ways in which they have grown a community to support teachers' growth.

Previous studies on communities of practice and professional development have focused on spaces designed specifically for the support of teacher interactions (Borko et al., 2010; Koc et al., 2009). In contrast, the #Edchat community was developed by teachers for teachers to meet their needs. #Edchat began as a way to have a specific time and hashtag to pull together educators on Twitter to discuss topics in the field of education. Stewart, Rachel, and the other founders of #Edchat began with a small idea and it grew into the community that exists today.

Through their continued work, they engage thousands of educators each week. Over time, the need for conversation developed into a community, connected by a hashtag.

The #Edchat group grew out of teacher interactions on Twitter and the need for a structured space to engage, converse, and connect. Together they have become a community of practice, supported by the research findings of community, domain, and practice, as well as many additional indicators. It is a part of the growth of communities in online spaces, a realm that was very underdeveloped and explored when the communities of practice theory was developed more than 20 years ago. Research on the #Edchat group adds to the body of research that is applying community of practice theory to online spaces, specifically Twitter.

Areas for Further Research

Future research on professional development should continue to look at best practices and how they apply to opportunities for both informal and online engagement. Though I believe it should not be the conclusive definition of whether a professional development session was successful, the inclusion of student achievement as an outcome for professional development is still an area for research within more informal professional development and that which occurs online. Overall, future research should continue to view best practices within professional development, specifically those that are relevant to online spaces.

In developing best practices within online spaces, I believe that the role of facilitation is a characteristic that should be added for consideration. MacPhail et al. (2014) mention facilitation as one of the five constructs present for "deep learning, a focused direction and growth" (p. 51). Within my research on the #Edchat group, the interviews with the weekly moderators explored their deep and behind-the-scenes work in making the weekly chat a success for those involved.

This expansion of the best practices will highlight those who facilitate the professional development alongside those who participate. This comprehensive look at professional development emphasizes the work of both those who develop professional development and facilitate sessions as well as the participants in the pursuit of best supporting teachers throughout their careers.

Research on the #Edchat group could focus more on the topics of the weekly #Edchat sessions, reviewing their relevance to the current focus in education. In addition, future researchers may want to explore the current duration of the #Edchat group and other chat groups on Twitter as it applies to education and encouraging teachers' growth and development. Within collaboration, researchers should consider taking on a more discursive viewpoint and engage further in the specific conversations within Twitter. Researchers can also explore findings concerning online talk and compare them with the engagement between teachers within the Twitter environment.

Future research on the topic of Twitter as a medium for online professional development could explore in what ways #Edchat serves as a gateway to other online education focused chats. Research could also explore Twitter's unique ability to share information and resources through only 140 characters. Researchers could look at the opportunities that are available due to the change in medium and ways teachers can harness the space of an online social network to support their growth and development.

Communities of practice experience an ebb and flow within their life cycle. Wenger (2011c) provides a distinction between communities and networks through a value assessment framework published through the Open University of the Netherlands. Along with his

colleagues, they identify five levels or cycles for communities of practice. Future research could apply this framework to the work of the #Edchat group in identifying where the community is within the cycle. This would assist in the overall growth of research around online communities of practice. Being able to determine what part of the cycle a community is in would allow supporters and developers to work to make changes that would assist in continuing the community or allow it to run its course for the support it has provided.

Future studies should also explore the ideas of conversation and connection that occur within communities of practice, as well as the organization of the community and the role of the moderator. Each of these aspects can make a contribution to our understanding of communities of practice theory. With a move toward researching communities of practice in online spaces and social media sites for their value and worth, further research on the #Edchat group will only assist in developing the field and supporting the work of educators.

The field of research around online communities, communities of practice, instances of online professional development, and the best practices in professional development is still very open for further study. Opportunities abound for the continued exploration of the many topics discussed through this case study of the #Edchat group.

Conclusion

This study was guided by the research questions, exploring what best practices of professional development were present on #Edchat and in what ways the group functions as a community of practice. Through the data I was able to establish the best practices of professional development that were present, those that were not, and additional indicators to advance the field. Through the lens of the communities of practice theory, I determined the domain,

community, and practice within the #Edchat group, as well as evidence of the presence of several indicators that constitute a community of practice.

This study was a brief exploration of the work of the #Edchat founders, moderators, and participants. Those I interviewed were those who were willing to share their work within the #Edchat group and together provided a rich and engaging view of the #Edchat group. During the interviews the members expressed their support for the continual growth of the community. I was able to experience the weekly chat through observations and reviewing the weekly chat transcripts. This experience of observation allowed for a better understanding of the work of the group, but was limited by only observing five weekly chats. This case study of the #Edchat group provided an opportunity to explore a community that has gathered weekly for many years and stood the test of time within an ever-changing field.

Future researchers can build upon the topics presented to continue the field of study on professional development and online communities of practice. Future studies can continue to identify virtual communities that serve as a form of professional development and assist teachers as they mature within their profession. The #Edchat group is a community that meets these requirements. Through the community they have built, they are connecting teachers and engaging them in conversation to support their growth as educators.

Designers of professional development, especially those designing in online spaces, should continue to employ best practices from the field of traditional professional development. Through the application of these best practices, they can work to improve the professional development provided to teachers and best support them as they develop as educators. I encourage leaders in the field of education to work for more than just growth in student

achievement as an outcome for professional development, but to best support teachers in their growth and happiness within the classroom.

As practitioners provide professional development opportunities to teachers, they would benefit greatly from the added aspect of community. The development of communities of practice support teachers as they move through the process of growing, changing, and developing as teachers. Through engaging with others, teachers can create a sustaining environment where they can connect with others and share information to support their work.

For teachers, the overall findings from the #Edchat group support their exploration of places of informal learning and serve as encouragement to search out spaces of connection to support their growth as a teacher. This encouragement will then trickle down to supporting the students within their classroom and enriching the education experience. My hope is that teachers continue to reach beyond the walls of their classroom to connect and engage with others as they navigate their work in the field of education.

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Appendices

Appendix A

Interview Protocol

Topic domain: Social Media

Lead off question:

1. Tell me about your use of Twitter.

[*Covert categories*: use of social media use, Twitter use, online networking, information sharing]

Follow-up question:

a. Besides the #EDCHAT group, what else do you do on Twitter?
b. What is it like staying within the 140 character limit?
c. What other social media sites do you use?

(Choose set of History questions according to the interviewee)

Topic domain: History (Questions to the founders of #Edchat)

Lead off question:

2. Tell me about how the #Edchat Group began.

[*Covert categories*: motivation, degree of involvement, roles, change over time, development, duration, domain]

Possible follow-up questions

a. Tell me about the others who were involved in the creation of the weekly chats.
b. Tell me about your involvement in the #Edchat group today.
c. How has the #Edchat group changed since it began?
d. What is it like staying within the 140 character limit?

Topic domain: History (Questions to general members of #Edchat)

Lead off question:

2. What first brought you to the #Edchat group?

[*Covert categories:* motivation, degree of involvement, use of social media]

Possible follow-up questions:

a. What is your current involvement in the #Edchat group?
b. How has the #Edchat group changed since you first joined?
c. What is it like staying within the 140 character limit?

Topic domain: Participation

Lead off question:

3. Describe to me a typical Tuesday night as you participate in the #Edchat discussion.

[*Covert categories:* engagement, tools and software, practice, duration]

Possible follow-up questions

a. What tools do you use?
b. What computing device(s) do you use to participate in the discussion?
c. Who are some of the core participants/leaders within the #Edchat group?
d. Have you personally recruited anyone to participate in the #Edchat weekly discussions?
e. What keeps you coming back week after week?
f. Can you suggest other members of the #Edchat group I should contact for interviews?

Topic domain: Content

Lead off question:

4. Tell me how the weekly topics are chosen for the #Edchat discussions.

[*Covert categories:* teacher/administrator input, choice, control over learning]

Possible follow-up questions

a. Have you ever suggested a topic for the weekly conversation? Tell me about that.
b. The members are involved in choosing the topics for discussion each week. Tell me how that works.
c. Can you tell me about a topic covered by the #Edchat group that you were particularly interested in discussing?

Topic domain: Community

Lead off question:

5. Tell me about the people you have me through #Edchat.

[*Covert categories:* relationships, use of social media, personal vs. professional, collaboration, practice]

Possible follow-up questions

a. Have you ever conversed with someone from the Edchat group outside of the weekly chat?
b. Have you ever met, in person, someone you met through the #Edchat group, such as at a conference or other event? If yes, tell me about that experience.
c. Are there people in the #Edchat you that you already knew prior to participating?

Topic domain: Professional Development

Lead off question:

6. Tell me about the last professional development session you participated in.

[*Covert categories:* feelings about Professional development, online professional development, online learning, offline learning, learning style]

Follow-up questions:

a. Have you ever participated in online professional development?
b. When you have the opportunity to choose your own professional development, what types of trainings are you drawn to?
c. In what ways does the #Edchat group assist you in your development as a teacher?
d. Tell me about a discussion on #Edchat that impacted your teaching.

Appendix B

Digital Tools for Qualitative Data Analysis

As I completed observations, I gathered my typed notes and transferred them to a Word document. I also transferred the transcript of the weekly chat from the Wiki into a Word Document. Each of these documents was uploaded into Atlas.ti version 7 for analysis. As I completed each interview, I transcribed the audio file using Inqscribe. Once complete, I transferred the transcript of the interview into a Word Document, converted to a PDF and uploaded into Atlas.ti version 7. Within Atlas.ti version 7, at the beginning of each interview I placed a note that identified the participant, date of the interview and description information for the participant, such as their job title and what brought them to #Edchat. During my first read through of the data within Atlas, I coded items that stood out to me with descriptive terms. As I coded, I wrote a description for the code in the notes section, providing information on my intent when using the code. Primary documents were placed in one of 3 categories, documents, observations and interviews. Codes were later grouped into families, focusing on the 3 areas of research Community of Practice, Informal learning and professional development.

As I moved through the data analysis process, I often shared my findings with my committee chair. I made memos and documented my findings or items that stood out within the data. After bundling my data, I would email it to my committee chair. She could then open and view my codes and memos. She would convers back through the memos, adding information. Once complete, she would then bundle and return the information to me by email. I could then open and read her comments and any additional information provided.

The act of analysis is the process of making sense of the material that has been gathered about the case. “Analysis is essentially the act of taking something apart” (Stake, 2005, p. 71), the breaking down of the data and looking for the patterns that emerge. I started by noting my impressions and understandings of what I have seen and heard within Atlas.ti version 7 and then moved through the data, looking for patterns and start to take note of instances that stand out. Instances that stood out were written out in a memo within Atlas.ti version 7

Data management is an important part of the process of data collection and analysis. Atlast.ti assisted in keeping all of my collected together in one location. All data was labeled with identifying information through a memo within Atlas.ti version 7. For interviews, they included a pseudonym, participant’s job title and how long they have participated in the #Edchat group. Each observation was be labeled with the date, topic and length of conversation, number of participants and number of tweets. This will establish the inventory of the data set (Merriam 2009) and will be stored electronically.

Appendix C

Research questions and data sources

Research Questions	**Data Sources**		
	Interviews	Observations	Documents
1. What best practices of professional development are present in the #Edchat group?	1, 3, 4, 5, 6	Yes	No
2. In what ways does the #Edchat group function as a community of practice?	1, 2, 3, 5	Yes	Yes

* *Transcripts of weekly discussions are categorized under observation*

Vita

Virginia “Ginny” Britt grew up in Middle Tennessee and received her B.S. in Music Education from Austin Peay State University. After completing her Master’s in Education degree from East Tennessee State University, she moved to Middle Tennessee to begin her career teaching in the Tennessee Public school system as a librarian. Her continued interest in supporting teachers in the field of technology integration led Ginny to enroll in a Ph.D. program at The University of Tennessee in the fall of 2009. During her time at The University of Tennessee, Ginny had the privilege of teaching a core course in the Teacher Education department for four years. This course, Integrating Technology in the K-12 Curriculum, provided Ginny with valuable teaching experience at the college level and the opportunity to support the next generation of teachers. During her time at UTK she also acquired a certificate in Qualitative Research Methods in Education. Ginny is currently working as an Instructional Technology Coach for a school system and will graduate in the spring of 2015 with a Ph.D. in Instructional Technology.